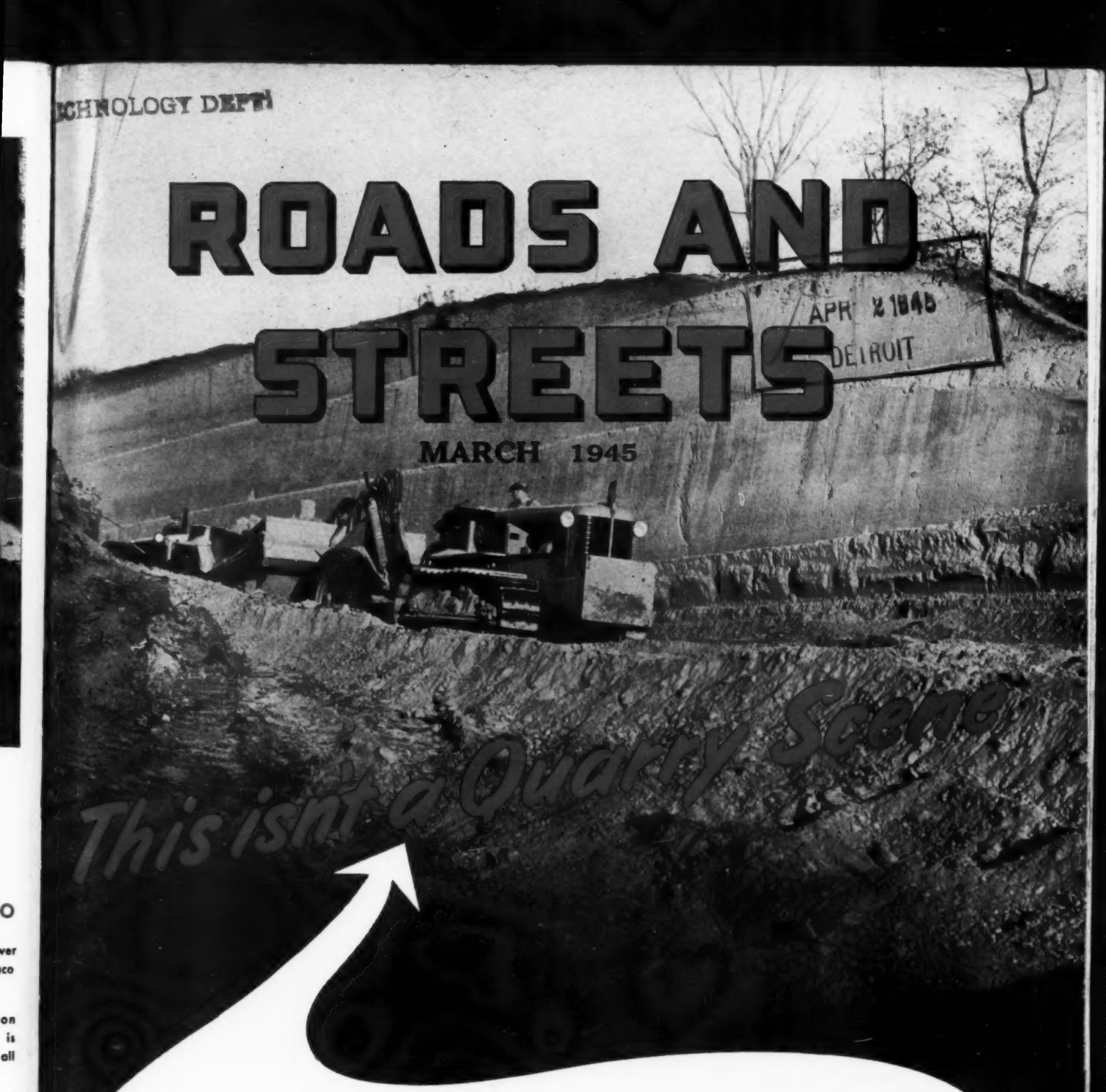
CHNOLOGY DEPT

ROADS AND STREETS

APR 2 1945
DETROIT

MARCH 1945



Although you could be excused for mistaking it for one. As a matter of fact the photograph was made during the construction of U. S. Highway 127 near Magnolia, Iowa and the quarry-like appearance in the background was produced by cutting through the layers of Iowa clay to bring the roadway down to specification.

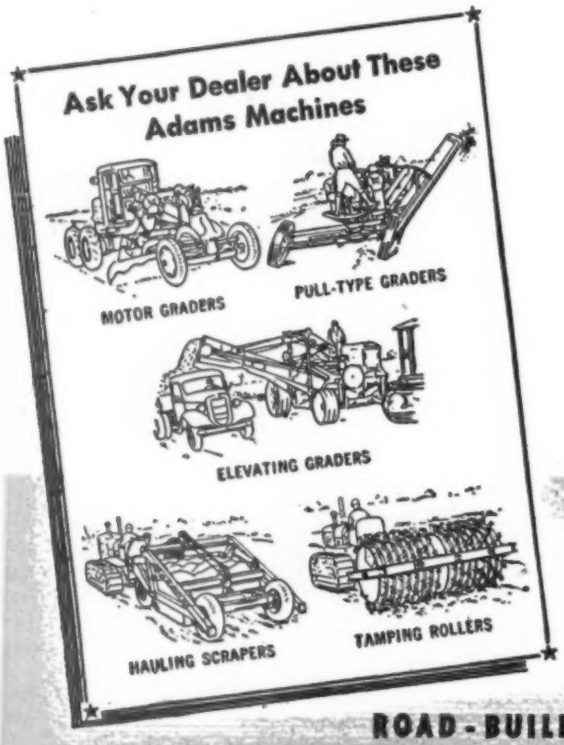
Handling the job was a large fleet of Allis-Chalmers HD-14 Tractors and Gar Wood Scrapers, all equipped with Timken Tapered Roller Bearings and owned by Frank Eblen Construction Company. The manufacturers of this equipment are long-time users of Timken Bearings; they know their value — and so do the equipment users.

Make sure you have Timken Bearings in the new equipment you buy. See that the trade-mark "TIMKEN" appears on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TAPERED ROLLER BEARINGS

NEW ROADS FROM BANK TO BANK....

with ADAMS MOTOR GRADERS



ADAMS MOTOR GRADERS are among the most versatile of all road-building machines. On most jobs—building new roads, or rebuilding and widening old ones—they handle *all* of the earth-moving involved. They cut and slope banks, build ditches and road beds . . . *and do the work exactly to specifications!*

Adams Motor Graders are fast, too—with an unusually large dirt-moving capacity. This, plus their wide range of power-operated blade positions—all obtained through fast, positive cab controls—assures maximum speed, economy, efficiency . . . *on every job!* Ask your local Adams dealer about these and many other outstanding advantages.

J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

Rig Your Hungry Buckets with

Purple Strand FORM-SET

THIS diesel-driven fellow isn't much concerned with his table manners. He opens his mouth, gathers in a big load at a single bite, and then expels it many yards distant. But he gets results, and that's what counts with the boss.

These results are affected materially by the wire ropes on boom and bucket. If they're Purple Strand ropes (the finest Bethlehem makes), they're going to give the crane plenty of lifting power, plenty of muscle to heft and swing the tonnage.

And here's a sound tip for men engaged in earth-moving work. On crane, shovel, and dragline jobs, the rope often curves around sharp bends—as, for instance, the sheaves and drums. So the logical choice is Purple Strand Form-Set; that is, Purple Strand that's been preformed.

Preforming takes "wildness" out of wire rope. It relaxes the rope, makes it more pliable. Also longer-lasting; for, with the tension gone, so are many internal stresses that sometimes shorten rope life.

If you want rope that doesn't get tired easily, write Purple Strand Form-Set into your next order. It will pay off in longer service and dollars saved . . . and you'll like the way it handles, too.

When you think WIRE ROPE . . . think BETHLEHEM

REPLACE TODAY with Scotchlite SIGNS

for GREATER Safety

OVER-ALL REFLECTORIZATION . . .

. . . gives a greater reflectorized area . . . complete coverage of the surface with SCOTCHLITE increases the attention value and makes it visible at greater distances. Color remains the same day or night. They stand out like illuminated markers . . . brilliant and clear without glare or distortion.

READABILITY DAY OR NIGHT

There's no blackout of the lettering on SCOTCHLITE signs for each letter remains sharp and clear—gives greater readability and does not blend with the reflective background. Fade-out of the message at any distance day or night is eliminated.

SHAPE, SIZE AND COLOR OF DAY-TIME SIGN RETAINED AT NIGHT

. . . a feature available only with SCOTCHLITE. Day or night the appearance of a SCOTCHLITE reflectorized sign is identical in shape, color and size, making it a greater safety factor.

SCOTCHLITE is a reflectorized sheeting that is available in roll form that can be cut to any size or shape and applied to your signs. Legends can be painted or silk screen processed. If you prefer, letters can be die cut and mounted to background. Years of use on highways all over the country prove its stability and effectiveness.

If you are installing new signs or making postwar plans, be sure to review the merits of SCOTCHLITE. Write for complete information.

AVAILABLE IN ROLL FORM
MADE AND PATENTED IN U.S.A. BY

3-M PRODUCTS

MINNESOTA MINING AND MANUFACTURING CO.
GENERAL OFFICES SAINT PAUL 6, MINN.
BRANCHES IN PRINCIPAL CITIES

ROADS AND STREETS

Vol. 88, No. 3 March, 1945

CCA

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; JOHN C. BLACK, Field Editor; LT. COL. V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

CONTENTS

Paving Methods at Marine Air Station 57
Road Builders Recommend on Surplus 59
New Highway Legislation Sought 60
Too Much Snow, Not Enough Plows! 61
How N. Y. Met Emergency 61
Erie County Methods 64
By Arthur J. Yaw, County Supt. of Highways, Buffalo
Buffalo's Problem: Equipment 67
By Newell L. Nussbaumer, Commissioner of Public Works
Heavy Equipment Saved Onondaga County 73
By Ray B. Traver, Supt. of Highways, Syracuse
Buffalo Airport Winter Maintenance Methods 79
By N. E. Duffy, Director of Airports, Buffalo
Editorial 82
Girders Set With A-Frames 50 Mi. From R.R. 83
Price Trends in Highway Construction 87
By R. H. Baldock, State Highway Engr., Salem, Oregon
Job and Equipment Ideas 90
Contract System Threatened by Proposed Fed. Law . 92
Snatch Loading Speeds Output of Scrapers 93
Associated General Contractors' Meeting 94
With U. S. Army Engineers Abroad 95
Tiling to Control Pumping Joints 97
Double "Shot Course" for Gravel Streets 99
Postwar State Highway Program for California 100
Construction Equipment Maintenance Section:
Good Shop System Paid Off 101
Plow Blade Life Increased by Flame Hardening . . . 106
By E. M. Sawyer, Supt. of Equip., N. Hampshire Highway Dept.
Handy Lifting Frame for Motor 108
New Equipment and Materials 112
Obituaries 119
With the Manufacturers and Distributors 120
Clearing House 126

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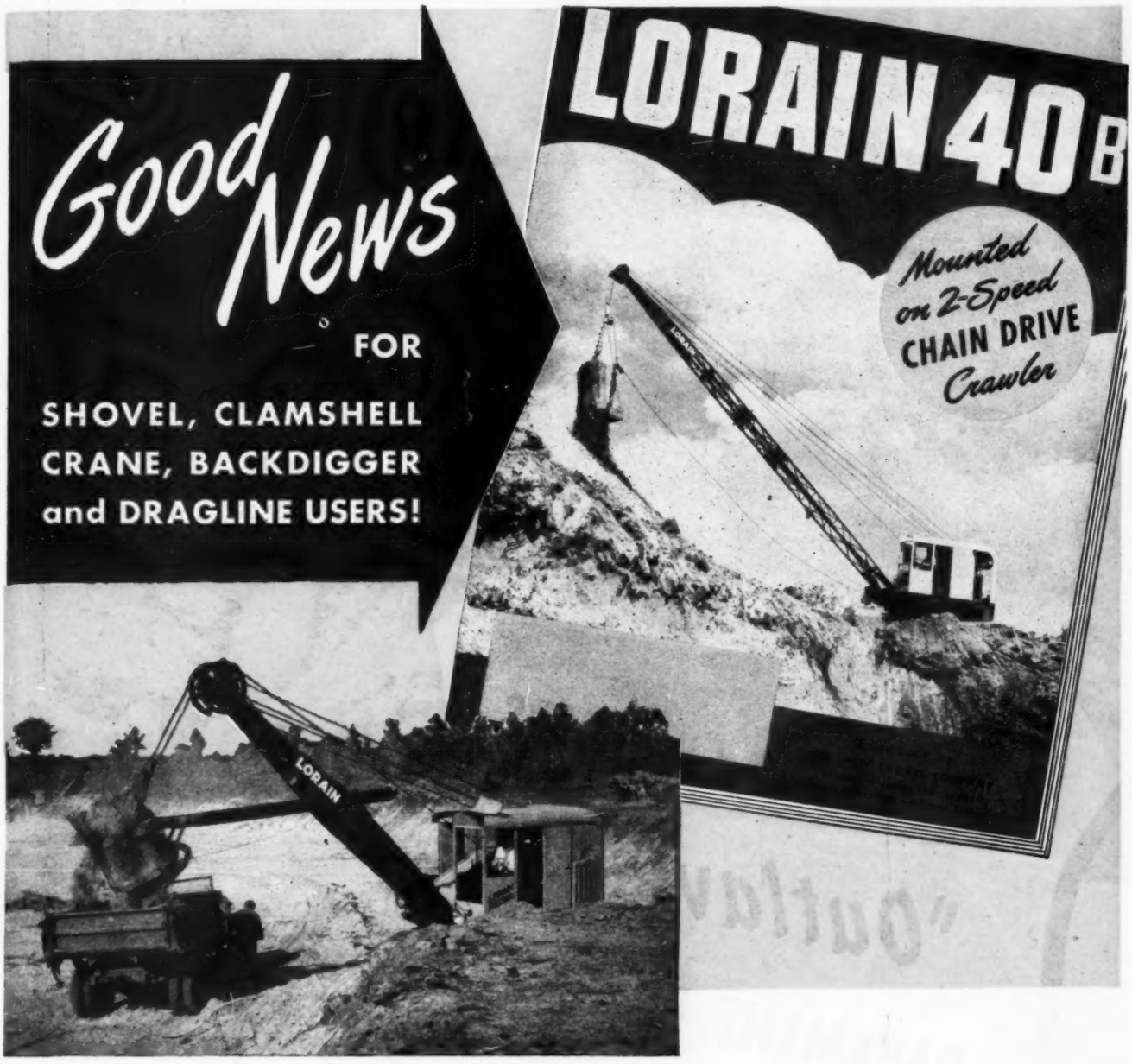
Good News FOR SHOVEL, CLAMSHELL CRANE, BACKDIGGER and DRAGLINE USERS!



HERE—in the Lorain 40-B is a new, improved version of a machine that has already proved its profit-making ability on literally thousands of jobs. Replacing the ¾-yard Lorain 40-A, the Lorain 40-B adds many features and advantages to a favorite, tested design.

There's a new, longer, heavier 2-speed chain drive crawler for better stability and extra maneuverability . . . extra soft ground flotation . . . balanced design turntable—and many other features that mean extra working and earning capacity in your new Lorain 40-B.

Send today for the Lorain 40-B catalog shown above. It gives you full details—in pictures, words, charts, and figures—on this improved Lorain. Whether you're interested in dragline, shovel, crane, clamshell or backdigger work you'll find good news and new profits in the Lorain 40-B! Write for your catalog now!

Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

HERE'S HOW ENGINEERS "Outlawed" PAVEMENT BREAKUPS

This state's highway subdrainage program was speeded and simplified by use of long lengths of sturdy, flexible perforated pipe. Begun in 1940, the work continues, and pays dividends in firm, smooth, pavements that require little maintenance.

★ ★ ★

Until 1940, pavement breakups were as "reg'lar as groundhog day" each spring on certain New England highways. Then state engineers went into action with a thorough subdrainage program. Today that work is paying off in firm, smooth pavements, less maintenance work, reduced costs. A vital factor was—and is—perforated metal pipe that intercepts ground water in the trouble spots. They keep pavement foundations stable and firm.

You can "outlaw" costly breakups the same way with ARMCO Perforated Pipe. Installation is easy and fast, and costs are low—thanks to the long pipe lengths, fewer joints, light weight, and freedom from breakage. Once in the ground, ARMCO Perforated Pipe has the flexible strength needed to resist traffic weight and impact, vibration and disjointing. Perforations instead of open joints reduce the hazards of clogging.

Remember that good drainage is costly only when omitted. Write us for literature on Designed Subdrainage. Armco Drainage Products Association, 155 Curtis St., Middletown, Ohio.

ARMCO Perforated Pipe

NORTHWEST *Performance* on RUBBER TIRES

When you think of Truck Mounted shovels, cranes and draglines, think of NORTHWEST. Northwest Truck cranes and Truck shovels bring you the advantages characteritsic of Northwest crawler equipment—advantages that mean better Truck crane and shovel performance.

Northwest Truck cranes bring you Northwest simplicity of design that cuts upkeep costs, the "feather-touch" clutch control for fast, smooth, easy operation, the cushion clutch that helps to make ample power safer and reduces the overloads on all parts under power, the uniform pressure swing clutches that take the nerve wracking jerks out of swinging, ball and roller bearings on all high speed shafts, the helical gear drive and many other Northwest features that have been proved in years of service on the big jobs of the country.

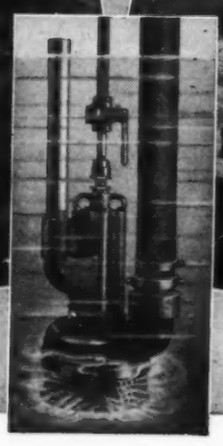
If you need truck mobility and want the smooth performance and high output for which Northwests have always been famous, check up on Northwest for your future plans.

NORTHWEST ENGINEERING CO.
1732 Steger Bldg., 28 E. Jackson Blvd,
Chicago 4, Illinois

NORTHWEST for TRUCK CRANES

FAST PUMPING with the CLECO-DEMING No. 183

On this job the water dropped so fast that the operator stayed with his valve.



Water gushing from the discharge pump at over 200 gallons per minute.

THIS air operated pump has no equal for the rapid expulsion of liquids from sumps, basements, pools, ship holds, manholes, cofferdams, ditches, etc.

Weighing only 58 lbs., easily portable, the Cleco-Deming sump pump is self-priming, and operates without hesitation when wholly or partially submerged. A screen, easily removed for cleaning, prevents stones or trash from clogging the impeller. All working parts are Cammelite plated to prevent rust. Special design features insure adequate lubrication at all times. For use with oil or gasoline, a bronze body is available at slight extra cost to safeguard against sparks. Write for Bulletin 86.

While the armed services are using Cleco-Deming sump pumps extensively, our production facilities enable us to supply these pumps for commercial use also.

MEASURED CAPACITIES

With Air at 80 lbs. Gage Pressure

Against 10-ft. Head . . . 230 Gals. per Min.
Against 20-ft. Head . . . 218 Gals. per Min.
Against 30-ft. Head . . . 195 Gals. per Min.
Against 40-ft. Head . . . 170 Gals. per Min.
Against 50-ft. Head . . . 145 Gals. per Min.

Maximum Head, 75 Feet

BRANCH OFFICES

Birmingham 1, Ala.
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Salt Lake City 1, Utah
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Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.

BUY U. S. WAR BONDS AND STAMPS

THE CLEVELAND ROCK DRILL COMPANY

Division of The Cleveland Pneumatic Tool Company

CABLE ADDRESS: "ROCKDRILL" • CLEVELAND 5, OHIO.

LEADERS IN DRILLING EQUIPMENT

DO YOUR POSTWAR PLANS INCLUDE

JOBS LIKE THIS ?

.... INVESTIGATE TOURNAPULLS

▲

-heaped yards were easily loaded on shal- shoulder cuts. Note accurate grading.

urnapulls hauled over the pavement to the arest farm where dirt was needed . . . no mage to pavement, no traffic delay.

▼

DIXON Construction Company of Albany, Wisconsin was awarded the job of modernizing the drainage on 28 miles of Illinois Highway 52 from Serena west to Highway 66.

The work consisted of regrading the drainage ditches and improving the shoulders throughout. Light cuts, long hauls, and on-pavement travel without interrupting traffic were involved. Surplus dirt was used to assist farmers in the area by correcting erosion in fields, filling unsanitary mud holes around barns.

Equipment for the job included two Super C Tournapulls, a snatch tractor and an auto patrol.

Tournapull performance proved particularly effective because of their high speed hauling, fast loading in light cuts, controlled spread and ability to haul on pavement without interrupting traffic.

Much postwar dirtmoving is going to give you special problems similar to this Dixon job. Plan now to equip with Tournapulls because they best fit profit making requirements of special and average jobs.

Your LeTourneau distributor can show you why Tournapulls can move dirt at lowest net cost per yard.

Super C Tournapull Specifications

Capacity:	
Struck	12.1 cubic yards
Heaped	15 cubic yards
Speed (high)	14.9 mph
Power	150 HP Diesel
Wheelbase	22 feet 0 inches
Width of cut	8½ feet
Tire Size	21.00 x 4
Weight (empty)	31,000 pounds
Weight per horsepower	207 pounds
Tractive weight (loaded) on power wheels	30,300 pounds

Interchangeable units: Tournacrane, rear-dump Tournatrailer, flat-bed Tournatruck.

Farmer taxpayers were happy to get low spots, mud holes and erosion washes filled. Because of this work, many benefitted by getting their Grade A milk certificates.

Output per 60-minute hour in common, 1,000-foot one-way, level haul, snatch loading, 156 pay yards per Super C.

RUBBER-TIRED POWER FOR FASTER EARTH MOVING

E TOURNEAU TOURNAPULLS

PEORIA, ILLINOIS · STOCKTON, CALIFORNIA

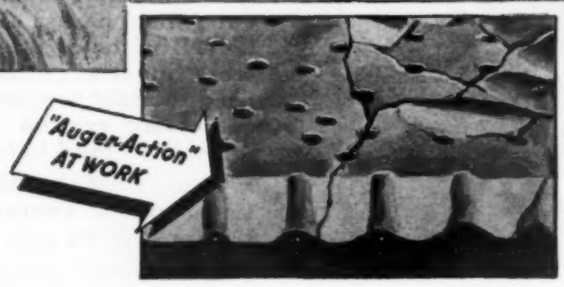
JOB PROVED

Manufacturers of TOURNAPULLS*, ANGLEDOZERS*, BULLDOZERS, TILTDOZERS*, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNATRAILERS*, TOURNACRANES*, TOURNATRUCKS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNAWELD*, TOURNALIFTS*.

*Trade Mark Reg. U. S. Pat. Off. C8

Over 2750 Built & Shipped

TO KEEP ROADS ICE-FREE... YOU "PASS the SALT"



...and make sure it's STERLING "Auger-Action" ROCK SALT!

KEEPING ROADS OPEN, drivable and *safe* on the coldest days and nights... calls for efficiency *plus* in removing snow and ice. And that's just where Sterling "Auger-Action" Rock Salt comes in!

This melting agent literally bores through crusted snow or treacherous ice. By breaking up the mass it makes ready removal easy. Or applied when a storm is beginning, it keeps snow from packing or bonding to road surfaces.

Many days of freezing weather remain. So "pass the salt"—Sterling "Auger-Action" Rock Salt, of course!—and save valuable time, conserve war-vital manpower... in keeping roads open in the bitterest weather. Its remarkable speed and efficiency make short work of the toughest winter hazards.

We Are Always Ready to Help Solve Your Ice Control Problems

Economy keynotes the Sterling method of snow removal! Engineers report one-third to one-half savings... communities report budgets sharply pared. Write today for free bulletin crammed with facts on streamlined ice-and-snow-removal. Free consultation with an International Field Engineer upon request. International Salt Company, Inc., Dept. RS-3, Scranton, Pa.

Sterling "Auger-Action" ROCK SALT

INTERNATIONAL SALT COMPANY, INC. • Scranton, Pa.

Heil Hi-Speed Cable Scraper

A push-loaded unit that gives you a heaped 15-yard load in 40 to 50 seconds. At the fill, the load is dumped and spread by a mechanical push-out action attained by tilting the floor. You get fast digging—fast hauling — fast dumping.

Heil Cable-Operated Trailbuilder

A ruggedly constructed 'dozer that is easily adjusted for an extra deep bite — whether in soft dirt or hard-packed clay. You get full vision ahead, fast cable control, smooth action that is easy on the tractor, and many other quality features.

Heil Hydraulic Bulldozer

From full-floating blade action to extreme height for throwing, these units give you extra versatility for a wide variety of jobs. Leak-proof unit stays in adjustment and needs but a minimum of maintenance.

R-44

You get speed of operation *plus* rugged, long-life construction with the...

Heil Bottom-Dump Wagon

The clamshell principle of high-clearance, power-opened, cable-controlled doors has made the famous Heil Bottom-Dump Wagon an amazing performer. It travels at speeds up to 27 m.p.h. — drops the load in a flash or spreads it almost like a cable scraper . . . turning at will off the windrow . . . moving over the fill with little or no slackening of speed.

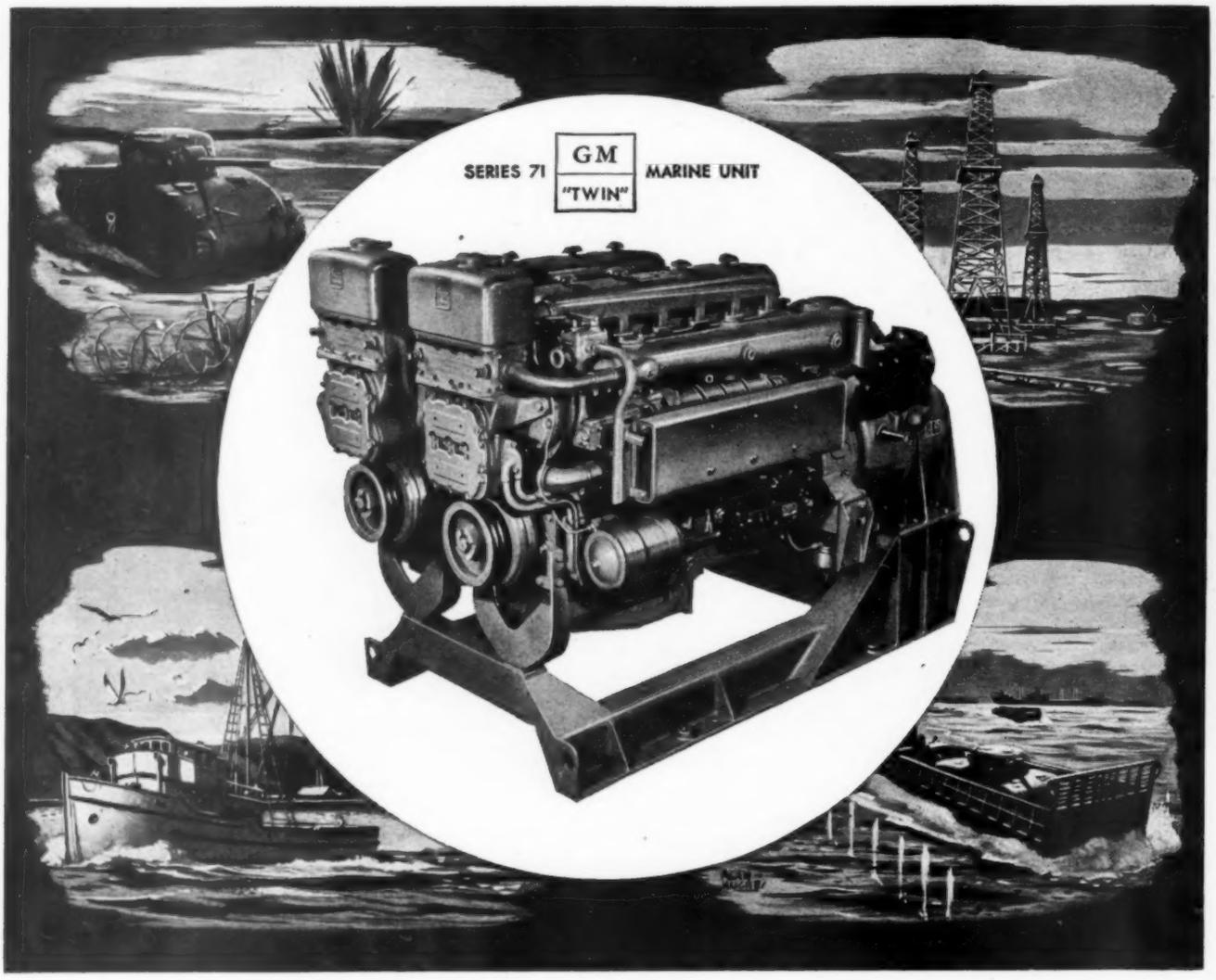
The unit is designed to maintain this performance over a long, useful, trouble-free life. The body is an all-welded steel-plate unit reinforced with sturdy, welded box sections. The big tires, well-distributed load, and easy maneuverability enable you to keep going on soft or rough ground.

You can stay out in front — in reputation and profits — with this modern, fast-operating, good-looking unit. Write for bulletins giving full details on Heil's advanced design or —

See Your Heil Distributor

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN



SAVING BOTH SPACE AND WEIGHT

This is a pair of General Motors series 71 Diesel engines built side by side, delivering their power through a single shaft. It is Detroit Diesel engineers' answer to an urgent call for a lot of dependable Diesel power in a small space.

Some of the jobs assigned the basic series 71 power units in "Singles," "Twins," and "Quads" are among the toughest on the books today—powering landing craft and driving Army M-3, M-4 tanks and M-10 tank destroyers.

It takes "oomph"—plenty of it—to plow a tank through hip-deep mud, to lift it out of shell craters, to keep it hot after the enemy—to beach and extricate a landing craft when the breakers are running high.

So it is easy to look ahead and see how these "multiple" Diesels will take hold of the countless jobs of industry and perform them equally well—particularly where the ratio of power to weight or space is of prime importance.

And remember, these "Twins" and "Quads," like the single sixes, share all the important developments which General Motors has contributed to Diesel science.

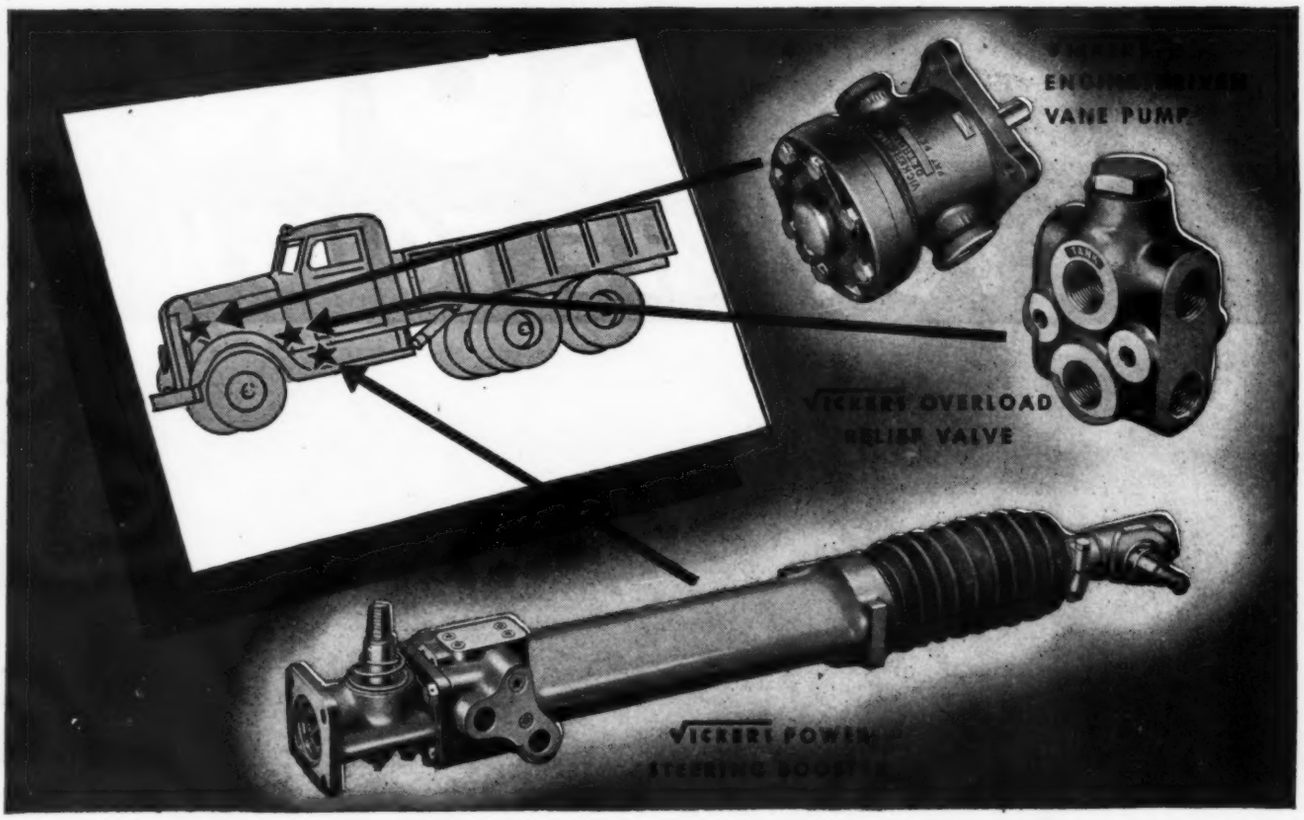
KEEP AMERICA STRONG
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

ENGINES . . 15 to 250 H. P. . . DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

ENGINES . . 150 to 2000 H. P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.



EASY INSTALLATION . . . Another Feature of

VICKERS HYDRAULIC POWER STEERING

Being compact and requiring a minimum of space for installation, the Vickers Hydraulic Power Steering System can be applied to most existing hand steering mechanisms with a few simple alterations. The separate and compact power cylinder (booster) can be located where it does not interfere with other apparatus and where the power will be applied directly to (and in line with) the drag link. No additional space is required at the end of the steering column where space is usually at a premium.

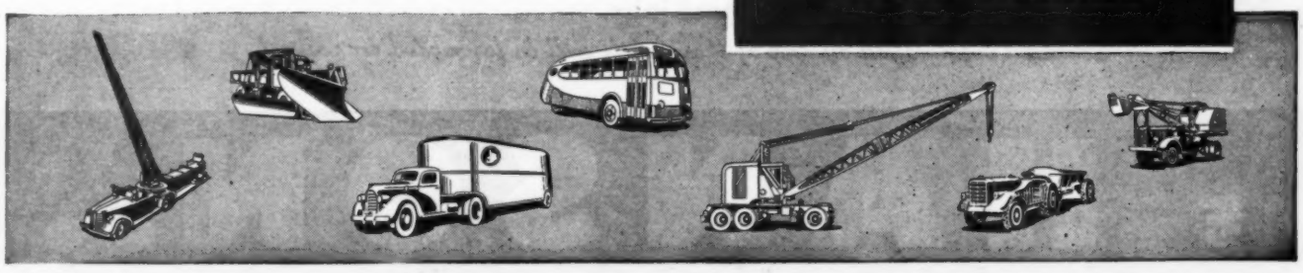
Other important advantages of Vickers Hydraulic Power Steering are: effortless, positive and shockless steering, automatic overload protection, reduced operator fatigue, greater road safety, automatic lubrication, and 14 years of operating experience. Bulletin 44-30 gives complete information about Vickers Hydraulic Power Steering; write for a copy.

VICKERS *Incorporated*

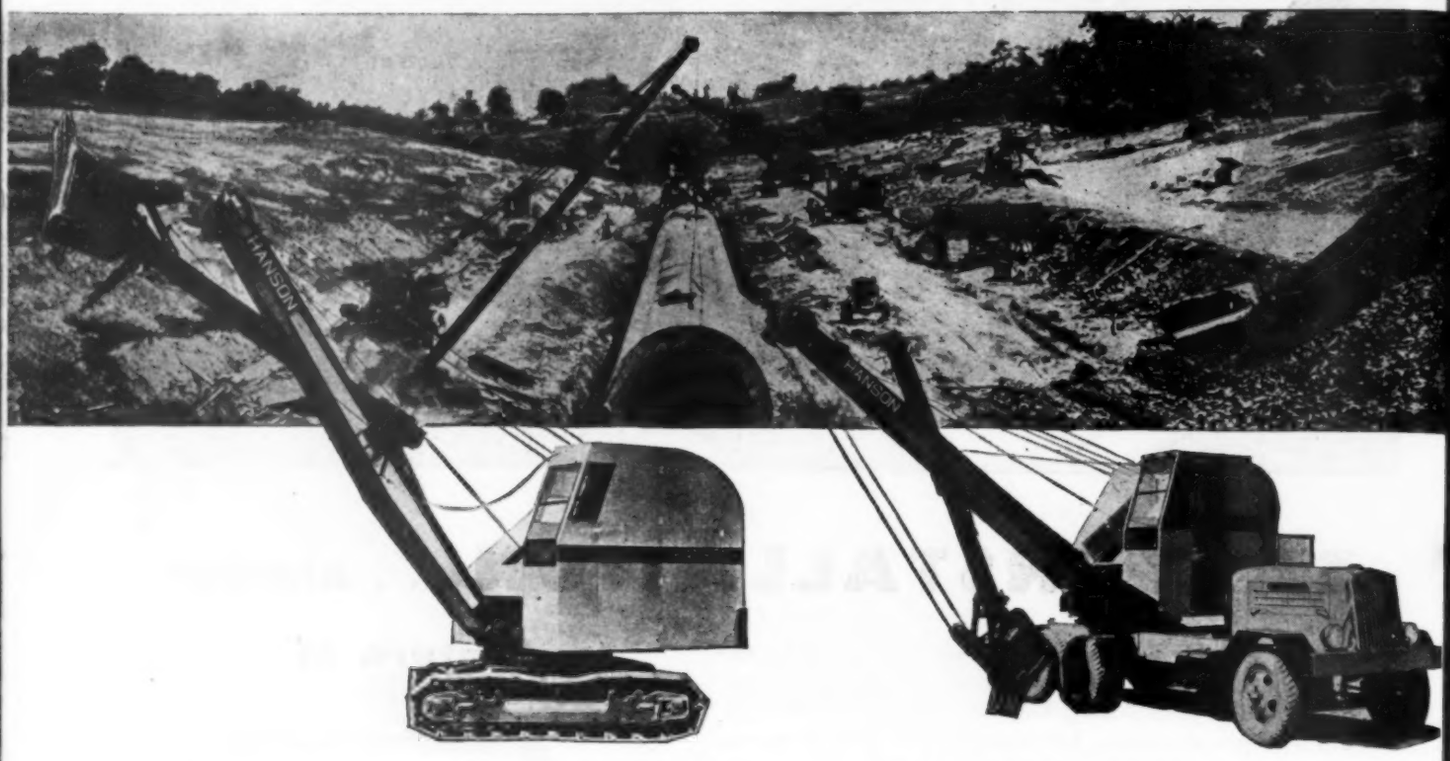
1432 OAKMAN BLVD. • DETROIT 32, MICHIGAN

Application Engineering Offices: CHICAGO • CINCINNATI • CLEVELAND • DETROIT
LOS ANGELES • NEWARK • PHILADELPHIA • ROCHESTER • ROCKFORD
TULSA • WORCESTER

Representative Applications of
VICKERS HYDRAULIC
POWER STEERING



HANSON
FOR THE TOUGH . .



EXCAVATORS, Crawler type . . . 3/8 and 1/2 Cu. Yd. Capacity; Full revolving — Chain Crowd — Welded Steel Construction — Low center of gravity — Heavy duty industrial type motor — Gasoline or Diesel.

Send for folder C45 for complete details

EXCAVATORS, Truck Mounted . . . 3/8 and 1/2 Cu. Yd. Capacity — Full revolving — Welded steel construction — 30 miles per hour road speed — Low center of gravity — Balanced design — Gasoline or Diesel.

Send for folder TMC45 for complete details

To their 25 years experience in designing and building successful earth moving equipment, Hanson engineers are daily adding a whole new wealth of know how gained in meeting war's unpredictable demands in every quarter of the globe. Hanson Engineers realize that post war jobs will bring new problems, new conditions, that those new conditions must be met with improved equipment. So they are incorporating into the Hanson line every improvement devised, every new technique discovered and every lesson learned in the biggest earth moving job in history. Thus each Hanson model will be *engineered* to meet these new conditions and to deliver fast, low-cost, profitable production, even on the toughest jobs.

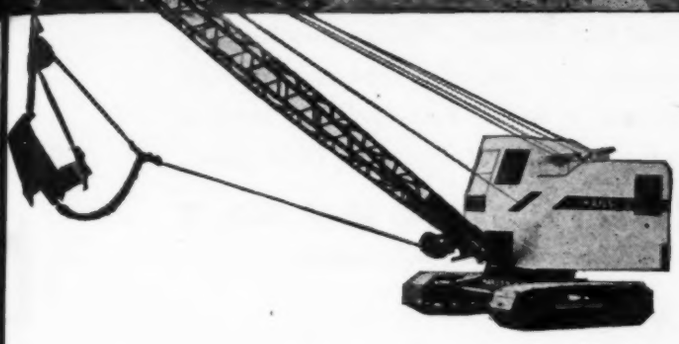
Detailed information on any of these units will be forwarded on request.

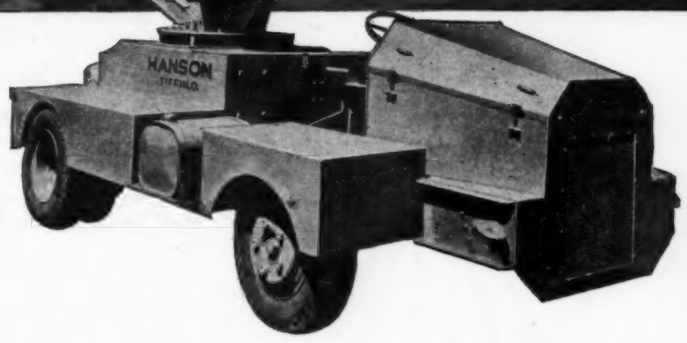
THE HANSON . .

TIFFIN, OHIO

Engineered EQUIPMENT

..JOBS AHEAD!





CRANES and DRAGLINES . . . 4 and 6 ton capacity—Full revolving—Lattice welded steel boom—Balanced design—Low center of gravity—Heavy duty industrial type motor—Gasoline or Diesel.

Send for folder EC45 for complete details.

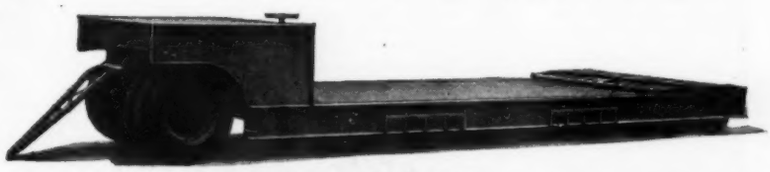
YARD and DOCK CRANES . . . 2 to 4 ton lift and carry—360° swing—2 to 30 miles per hour operation—one man operation—short turning radius—a thousand uses in fast, economical material handling.

Send for folder Y & D45 for complete details.

CONVERTIBLE

All Hanson Excavator and Crane Models are convertible to;

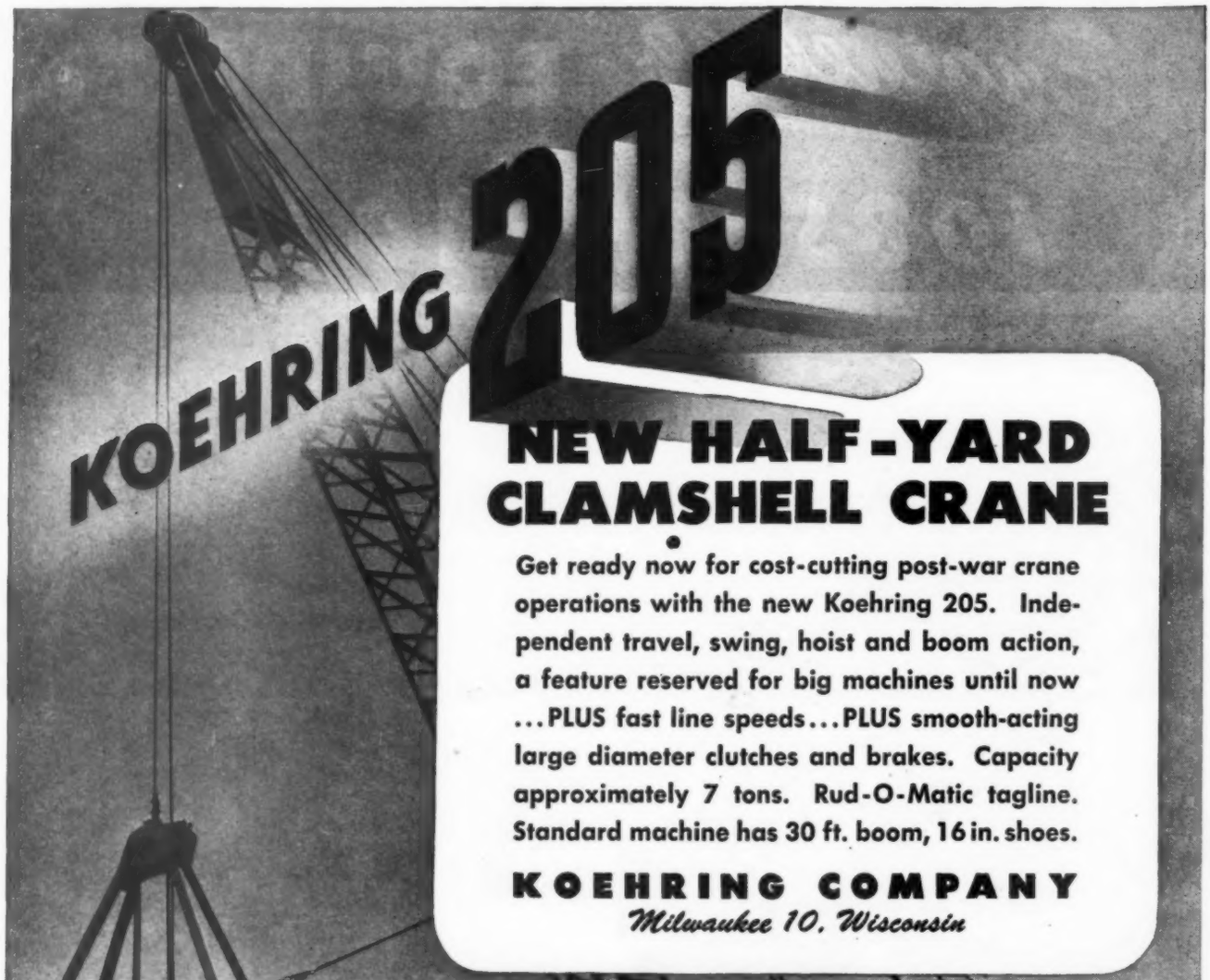
SHOVEL—CRANE—DRAGLINE—PILE DRIVER—CLAMSHELL—TRENCH HOE



MACHINERY TRAILERS . . . 10 to 40 ton capacity—Heavy duty, goose-neck construction—semi and full types—Oscillating rear axles—Pneumatic tires Brakes; Internal expanding, and air or vacuum. Timken taper bearings throughout.

Send for folder T45 for complete details stating size of Trailer you require.

CLUTCH AND MACHINERY CO.



NEW HALF-YARD CLAMSHELL CRANE

Get ready now for cost-cutting post-war crane operations with the new Koehring 205. Independent travel, swing, hoist and boom action, a feature reserved for big machines until now ...PLUS fast line speeds...PLUS smooth-acting large diameter clutches and brakes. Capacity approximately 7 tons. Rud-O-Matic tagline. Standard machine has 30 ft. boom, 16 in. shoes.

KOEHRING COMPANY

Milwaukee 10, Wisconsin

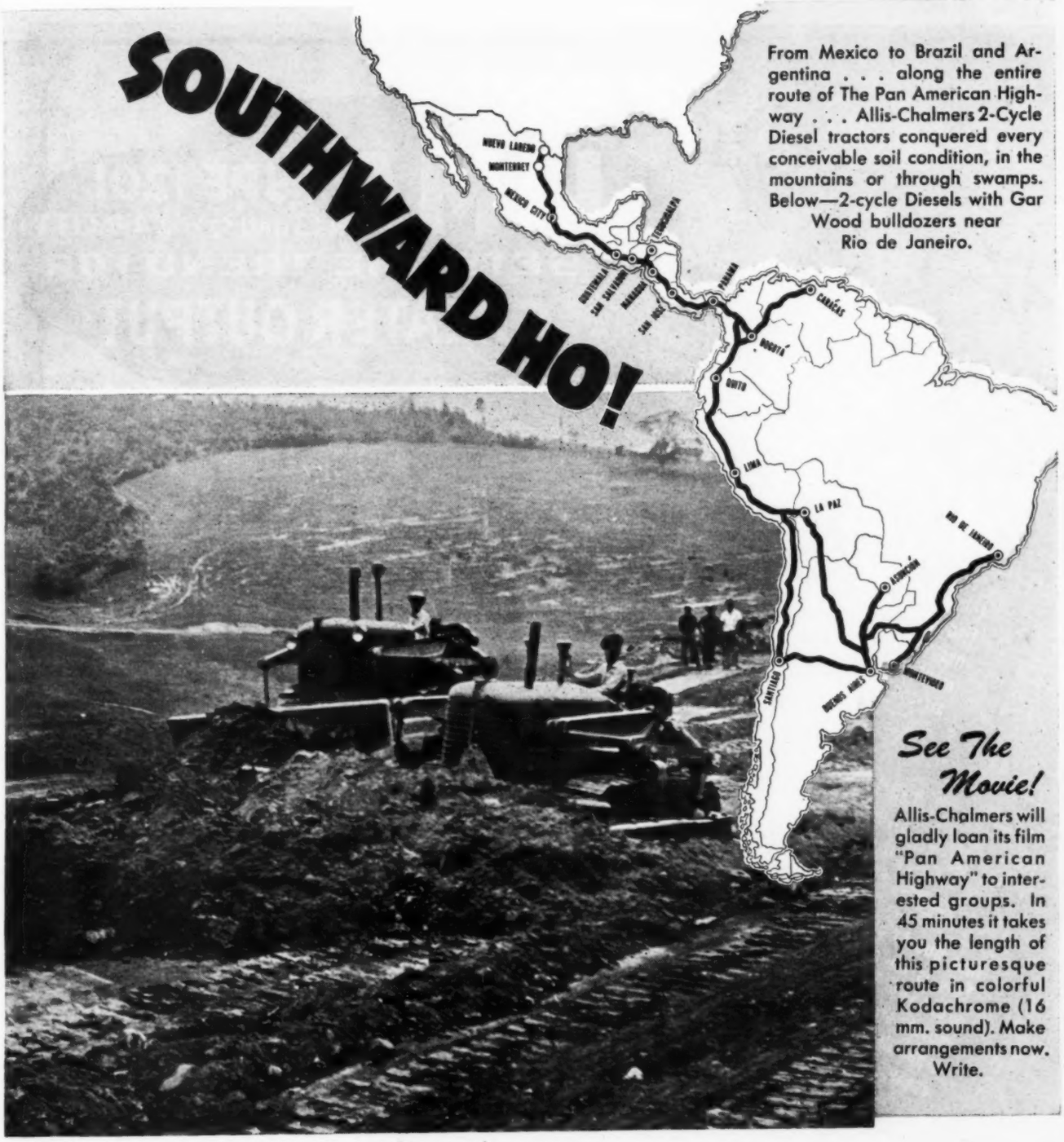
Orders Accepted NOW for Post-War Delivery . . . .

KOEHRING HEAVY DUTY

ARMY E NAVY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

SOUTHWARD HO!



From Mexico to Brazil and Argentina . . . along the entire route of The Pan American Highway . . . Allis-Chalmers 2-Cycle Diesel tractors conquered every conceivable soil condition, in the mountains or through swamps. Below—2-cycle Diesels with Gar Wood bulldozers near Rio de Janeiro.

See The Movie!

Allis-Chalmers will gladly loan its film "Pan American Highway" to interested groups. In 45 minutes it takes you the length of this picturesque route in colorful Kodachrome (16 mm. sound). Make arrangements now. Write.

Soon it will be Southward Ho . . . into the lands of ancient men . . . to the "last frontiers of the Western Hemisphere." The Pan American Highway System will open the way to new, unexplored, unknown riches . . . commercial trade . . . exchange of tourists, culture and knowledge.

A dream in 1924 . . . it is expected to be opened for all weather travel late in 1947. Only gaps remain to be completed. Beginning at Nuevo Laredo, Mexico, it links the capitals of 17 Latin American countries — as far south as Buenos Aires, Argentina, thence north to Rio de Janeiro, Brazil.

Constructing this link to American solidarity is one of the toughest jobs ever undertaken. Carved through treacherous mountains, jungles and swamps it is an outstanding achievement . . . a worthy monument to its planners and builders, and to the efficiency of modern road building machinery. A great number of Allis-Chalmers tractors and graders are playing an important part in the building of this lifeline.

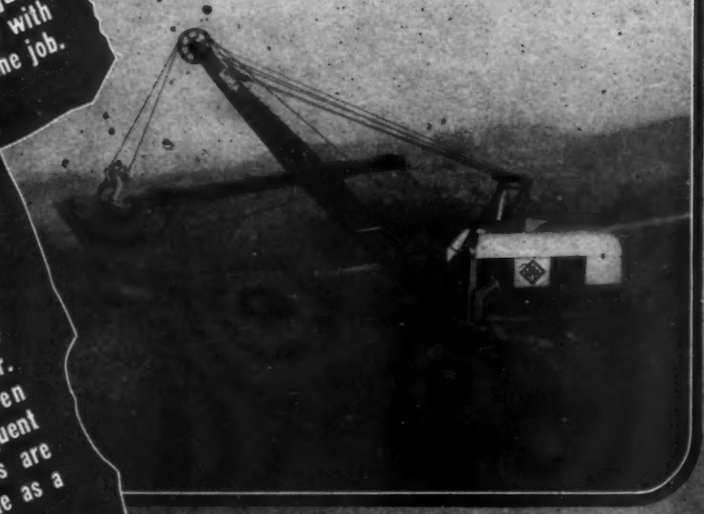
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

LIMA TYPE 1201 (3 and 3½ Yd. CAPACITY) SETS THE TREND FOR GREATER OUTPUT

The smooth, effortless control of the LIMA Type 1201 is made possible through air-operated clutches. This all-important feature assures greater output thru less operator fatigue. A further advantage effective thru air-control is, simplified clutch adjustment. Only one adjustment necessary and when made, will retain the adjustment for several months. A LIMA Type 1201 with air-control means more productive time on the job.

The LIMA Type 1201 can hoist, swing, travel or boom up or down at the same time. This advantage enables the user to do a wider variety of work without the loss of time due to changing from one motion to another. This is an advantage you will appreciate when working in close quarters or where frequent moves are necessary. Independent clutches are especially desirable when working machine as a crane.

The greatest destroyer of machinery is friction. This profit taking hazard is overcome in the LIMA Type 1201 by the use of anti-friction bearings at every vital bearing point. LIMA does not stop at putting these wear resisting bearings only where high speed shafts revolve, but in the clutches, drums, cone rollers and other points where friction is commonly found. It costs less in the long run to operate a LIMA.



Regardless of how carefully a job is figured, how skillfully it is laid out, profitable results depend on the selection of the right type of equipment and its advantages to make big output possible. The LIMA Type 1201 shown in the illustration is a 3 or 3½ yard shovel (depending on length of boom and handle) or a 65 ton crane. It is in high favor with quarry operators, open-pit miners and contractors who demand top-notch performance from the equipment they buy. Look to LIMA for the shovel, crane or dragline of the right capacity for the job you are planning.

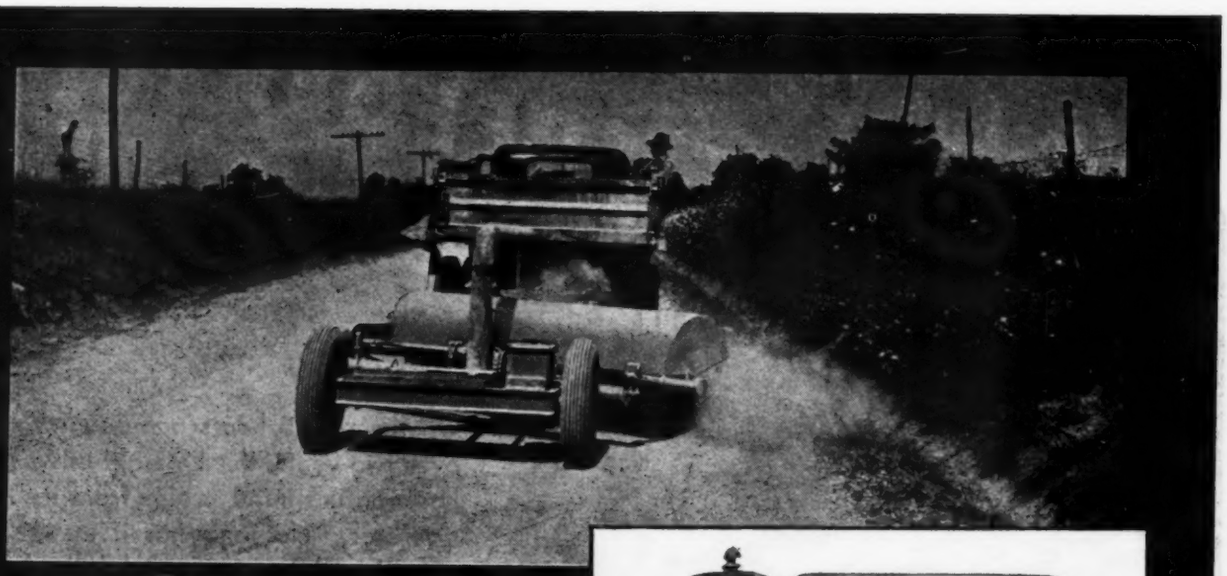
LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division - - LIMA, OHIO, U. S. A.

NEW YORK, N. Y. PHILADELPHIA, PA. NEWARK, N. J. MEMPHIS, TENN. ST. LOUIS, MO.
DALLAS, TEXAS PORTLAND, ORE. MINNEAPOLIS, MINN.
SAN FRANCISCO, CALIF. SEATTLE, WASH. LOS ANGELES, CALIF. SPOKANE, WASH.
MONTREAL, Quebec, Can. VANCOUVER, B. C.

★ QUARRY WORK

LIMA *Cranes Shovels Draglines*

Capacities CRANES 13 TONS TO 100 TONS
SHOVELS ¾ YD. TO 5 YDS. DRAGLINES, VARIABLE



ROAD BROOMS

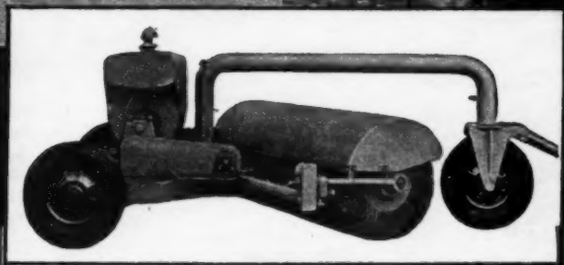
BOTH LITTLEFORD BROOMS ARE TWO-WAY BROOMS

Before applying asphalt, tar, emulsion, road oil, or cut-back to our highways, the Littleford Road Broom sweeps away the dust and dirt so that the bituminous material can make a perfect bond with the road surface.

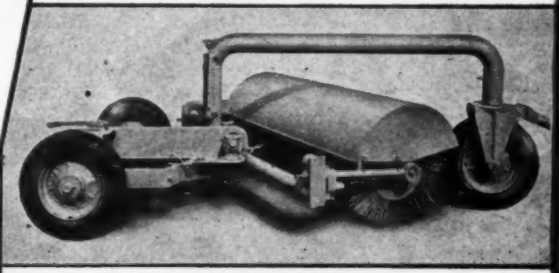
Any desired pressure of the Broom can be applied to the road surface due to the Hydraulic Lifting Arrangement which allows the Broom to be raised or lowered to give the proper tension.

Littleford Road Brooms are made in two models—Model No. 106 Traction Driven Broom and Model No. 108 Power Driven Broom. Both models can sweep either to the right or left and can be changed from one position to the other in less than two minutes' time.

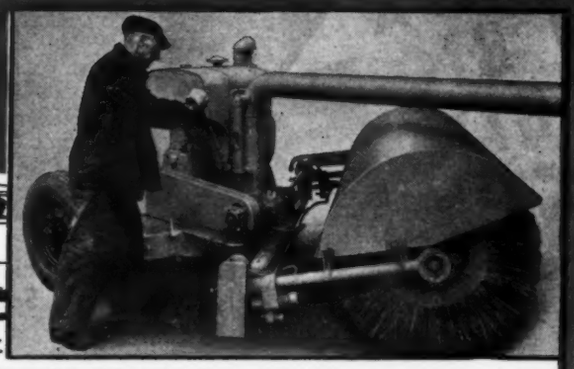
Littleford Road Brooms are the answer to better post-war roads.



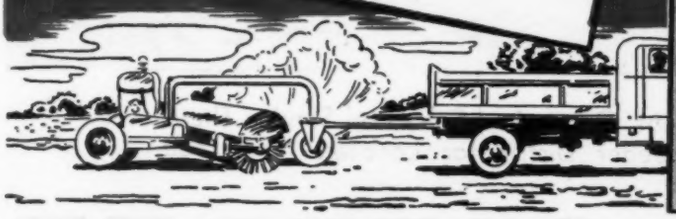
MODEL NO. 108
POWER DRIVEN BROOM



MODEL NO. 106
TRACTION DRIVEN BROOM



Hydraulic Lift raises and lowers the Broom and adjusts the Broom tension on the road surface.



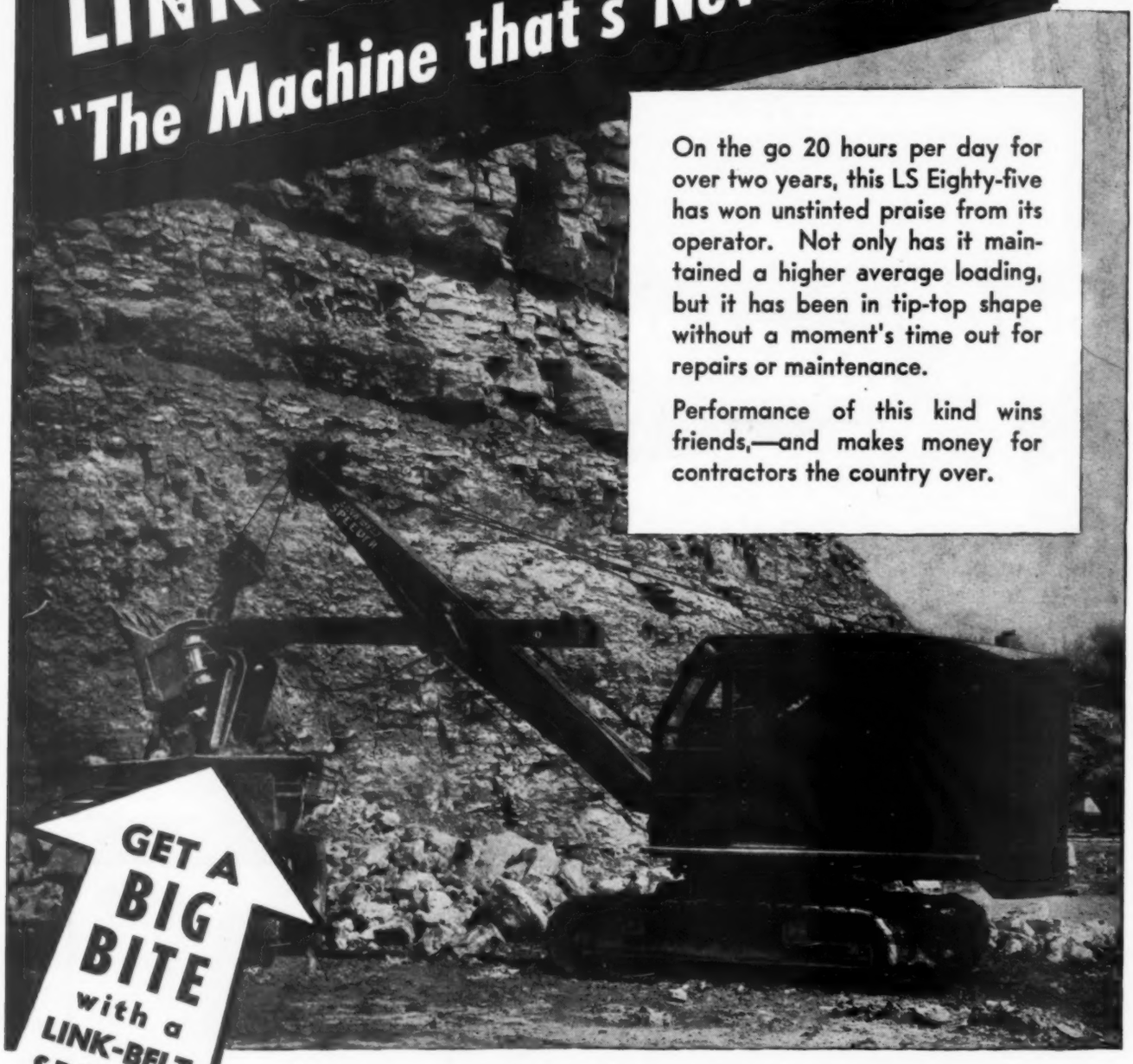
BLACK TOP ROAD MAINTENANCE EQUIPMENT
LB
SINCE - 1900

LITTLEFORD

454 E. Pearl St.

LITTLEFORD BROS., INC.
Cincinnati 2, Ohio

We Call Our LINK-BELT SPEEDER "The Machine that's Never Down!"



On the go 20 hours per day for over two years, this LS Eighty-five has won unstinted praise from its operator. Not only has it maintained a higher average loading, but it has been in tip-top shape without a moment's time out for repairs or maintenance.

Performance of this kind wins friends,—and makes money for contractors the country over.

GET A BIG BITE with a LINK-BELT SPEEDER

For Prompt, Efficient, Convenient Sales and Service There Is a Link-Belt Speeder Distributor Located Near You

9854

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
A DIVISION OF LINK-BELT COMPANY

Snogo IS AN "ALL COMMUNITY TOOL"

Even the mothers in your district are interested! When snow begins to fall, anxious eyes turn toward the windows and anxious thoughts are on the road.

In SNOGO protected communities the youngsters get to school—and back. This certain *safety* puts the community 100% behind the work of the highway department men and the SNOGOS they install.

SNOGO throws the snow OFF the road. No banks build up in ever deepening, narrowing lanes. Ditches are open for proper drainage. Road shoulders are not covered with heavy blankets of snow. There will be no excess seepage later to undermine road surfaces. When SNOGO clears the road, the job is all done until the next snowfall. It is the kind of job that assures *full* use of the roads and keeps traffic moving.

Plan ahead for safety. Write for full information on SNOGO equipment.

KLAUER MANUFACTURING CO.
DUBUQUE, IOWA

SNOGO

A SNOGO For EVERY BUDGET

Rock is "Duck Soup" FOR MARION SHOVELS

15 YEARS AGO we said:

"MARION is a real rock shovel".

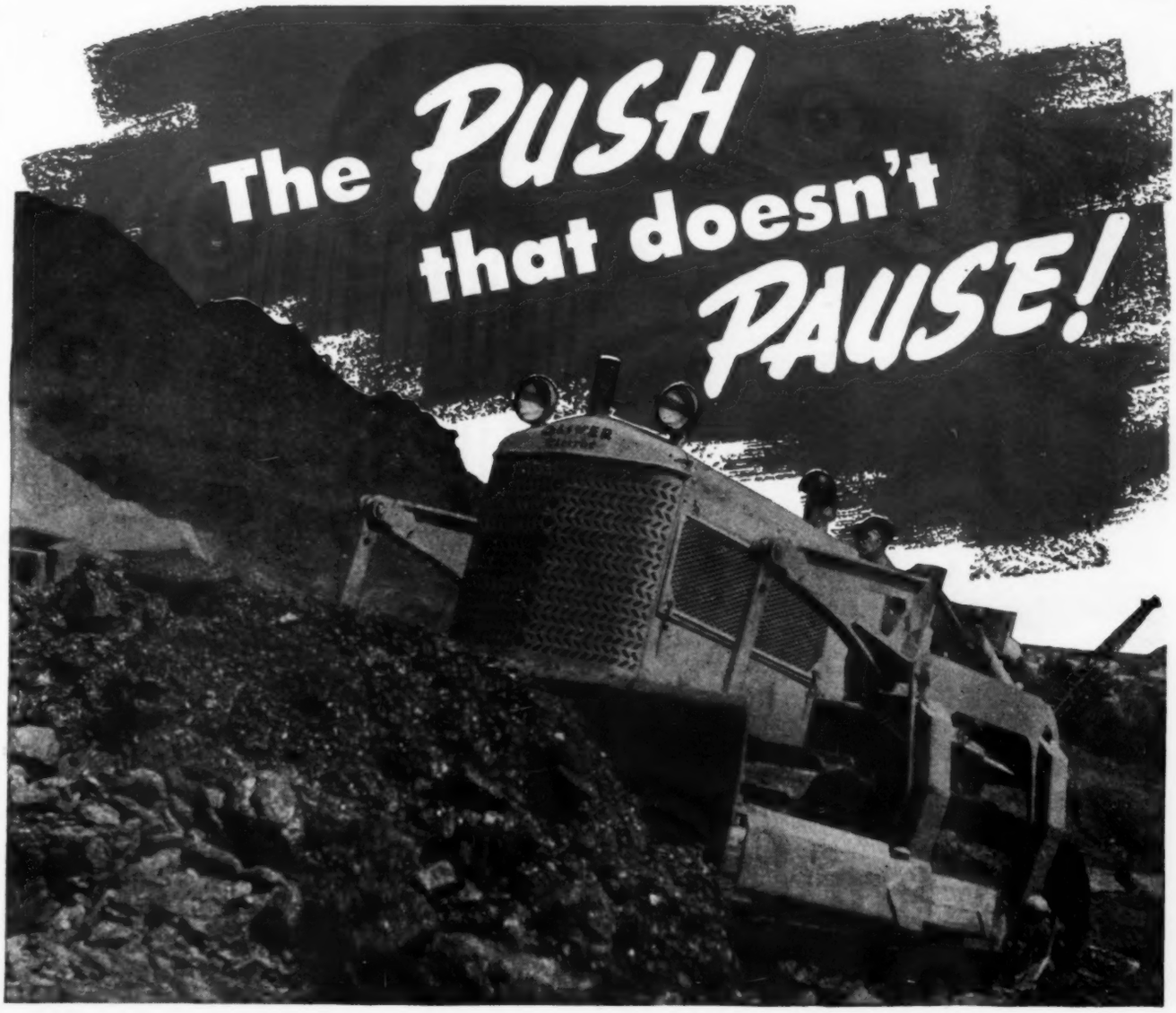
MARIONS have stood the test of time and always will be the leader in rock or dirt digging.

What are your problems? Let's discuss them.

THE MARION STEAM SHOVEL CO. • MARION, OHIO

SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS

CLAMSHELLS • WALKERS • *from 3/4 cu. yd. to 35 cu. yds.*



They keep pushing! That's why Oliver "Cletrac" tractors move heavier loads . . . faster . . . more economically. Both tracks keep working all the time . . . on the turns as well as straightaway. There's no pause in the flow of pushing power. For only Oliver "Cletrac" gives you *controlled differential steering.*

On any job, push or pull, Oliver "Cletrac's" controlled differential steering principle provides these outstanding advantages. Off-center loads are handled with ease. There's no need to "declutch" or "brake" when turning, providing greater safety on hills and slopes. Oliver "Cletracs" don't zig-zag. They steer the same going downhill as up. Power is never disconnected from either track.

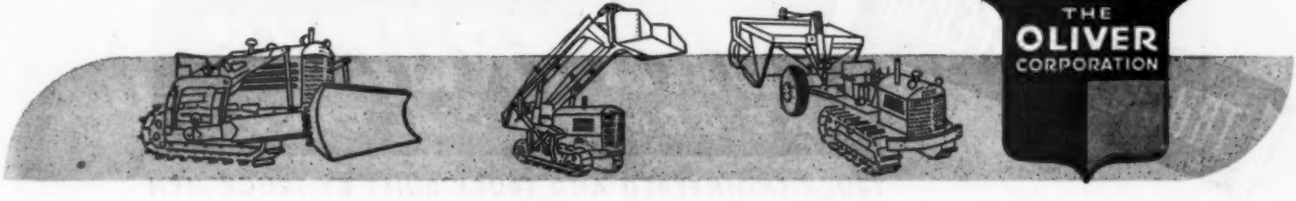
These husky tractors offer other equally important features. And because they are unusually accessible, maintenance is a simple task.

Substantial numbers of Oliver "Cletrac" tractors are now being released for essential use. Your Cletrac dealer will gladly assist you in making application for a new tractor.

The OLIVER Corporation

Industrial Division: 19300 Euclid Avenue • Cleveland, Ohio

OLIVER - Cletrac



More Ford trucks on the road

On more jobs

For more good reasons!

TRUCK-ENGINEERED

FORD TRUCKS
AND COMMERCIAL CARS

TRUCK-ENGINEERED AND TRUCK-BUILT BY TRUCK MEN

Powerful Air-Operated Cable Hoist

Smooth operation at touch of a finger avoids "jerky" starts and stops. Takes up or releases to exact position desired. Saves cable wear and down time for repair.

You never have to slacken speed with a Wooldridge Terra-Cobra while traveling, spreading or turning due to positive two-wheel hydraulic steering. Both wheels are controlled by a single steering bar. There are no steering clutches to fight nor individual brakes to grab—no danger of "jacknifing." The front drive wheels are under full traction and power at all times even on turns—and they maintain a fixed direction of travel over soft, rough, rocky or uneven ground. Rapid acceleration and surplus rim pull insures high average speeds and greater yardages at a lower cost. Get the full details on high speed earthmoving.

WRITE TODAY FOR NEW TERRA-COBRA BULLETIN

WOOLDRIDGE MANUFACTURING CO.
SUNNYVALE, CALIFORNIA

WOOLDRIDGE *TERRA-COBRA*
SELF-PROPELLED EARTHMOVERS

Preformed wire rope

CUTS PRODUCTION COSTS 3 WAYS

One reason is enough—but here are *three* reasons why Preformed wire rope cuts production costs:

1. Preformed lasts longer; pays bigger dividends on wire rope dollars.
2. Preformed rotates less. You don't have to repair or replace sheaves, drums and rope so often.
3. Preformed winds easily on drums. You encounter fewer delays. Your men and machines produce more per day, per month, per year.

Thousands of operators have standardized on Preformed—and use nothing else on tough wire rope jobs.

ASK YOUR OWN SUPPLIER FOR PREFORMED WIRE ROPE

The accumulated experience of 35 years of four-wheel-drive leadership is embodied in this FWD Model HAR . . . a truck endorsed by owners, in just four years, to the extent of 50 million dollars in purchases.

A Handsome Line of Truly Great Trucks that

FWDs

HAUL LONGER FOR LESS

Like all FWDs in the complete range from 2½ to 15-ton trucks, the FWD model HAR commands the respect of all who know quality. Its fine appearance speaks for superior power, ruggedness, performance without waste, and ability to HAUL LONGER FOR LESS!

Figure less depreciation, more years, more mileage for FWDs. Figure less upkeep and operating costs. Balanced weight distribution and the four-wheel-drive principle reduce driving strain 50% on each axle. Figure less tire cost . . . equalized power distribution and balanced load on all four wheels prevent the slips, skids, slues and scuffs that tear down tires. Figure less fuel cost . . . 88.2% of engine power goes to move payloads . . . with power in all four wheels. Figure less cost-per-ton-mile . . . wide range of gear ratios and FWD traction on all wheels permit more speed on hills, curves and tough roads. ☆ Figure FWDs in the future, too, to haul longer for less.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis. *Canadian Factory: Kitchener, Ontario*

A LIMITED NUMBER OF FWDs AVAILABLE THIS YEAR. Phone, wire or write us, or see the nearest authorized FWD dealer for priority data.

FWDs ask LESS in GAS—OIL—TIRES

Road ditching, State of Ohio, with FWD road maintenance truck.

FWDs are always reliable on material handling and earth moving operations.

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

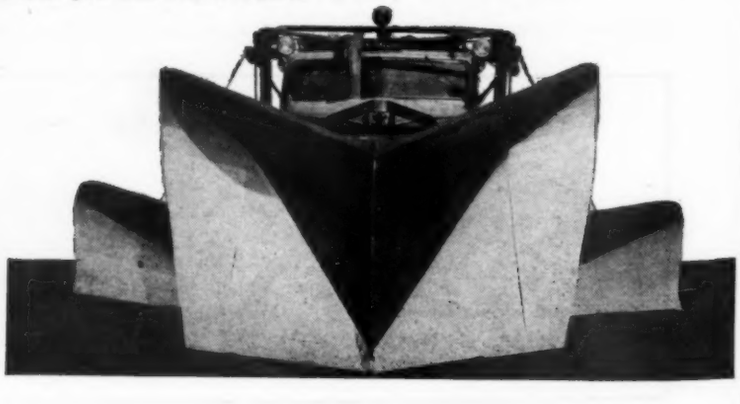
EQUIP WITH SPECIALIZED

WALTER SNOW FIGHTERS

... AND ORDER EARLY!

Every highway and airport official in the "snow belt" will agree that the big lesson hammered home by last winter's record blizzards, is this: *The surest safeguard against costly, crippling snows is to be adequately equipped with the most modern, powerful snow-fighting equipment.* And right now is the time to benefit from that lesson, when early action can insure delivery for the coming winter.

Send today for the facts on Walter Snow Fighters. Learn how these rugged units are specially engineered and constructed for one, tough job . . . SNOW REMOVAL. Learn why they clear more miles per hour—why they cut snow removal costs—why they keep driving ahead under conditions that stop any other truck. Prompt planning now, means better protection next winter.



WALTER MOTOR TRUCK COMPANY
1001-19 Irving Ave., Ridgewood 27; Queens, L. I., N.Y.

MORE OUTPUT.... THE *Smooth* WAY....

There's an extra output dividend when power rides to the point of action on anti-friction bearings. Every power transmitting part on the revolving frame of ⅜-, ½-, and ¾-yard Bucyrus-Eries is mounted on ball or roller bearings. That means smooth, big-output performance because friction is reduced, alignment maintained, parts held in accurate adjustment. The resulting easy sustained operation means lower maintenance and longer yardage-producing machine life, too. 3E45

Smooth performance with anti-frictions is only one of numerous reasons why Bucyrus-Eries are output leaders in excavating on the battlefronts and at home. The full Bucyrus-Erie performance story will convince you.

SO. MILWAUKEE **BUCYRUS ERIE** WISCONSIN

WARD LA FRANCE

THE FINEST HEAVY-DUTY TRUCKS MONEY CAN BUY

For over twenty-five years, Ward LaFrance has been building a traditionally fine line of heavy-duty motor trucks. Each successive year has brought advances in design and engineering. Today's Ward La France is better than ever.

The finest Ward La France trucks ever built are now serving the United Nations all over the world. They are the huge, type M-1 Heavy Duty Wreckers which have compiled an unbeatable record for stamina and dependability.

Postwar Ward La France trucks and over-the-road tractors, both gasoline and Diesel, offer fleet owners the opportunity for the most efficient hauling in trucking history . . . Write our Sales Department for the Ward La France fleet-owner plan.

FRANCHISES AVAILABLE

Progressive, merchandising-minded concerns eager to expand their profit possibilities by broadening their market potentials, would do well to consider the fertile, heavy-duty truck market. Investigate the profit potential in the Ward LaFrance line . . . Our Sales Department will be happy to supply information about available franchises.

WARD LAFRANCE

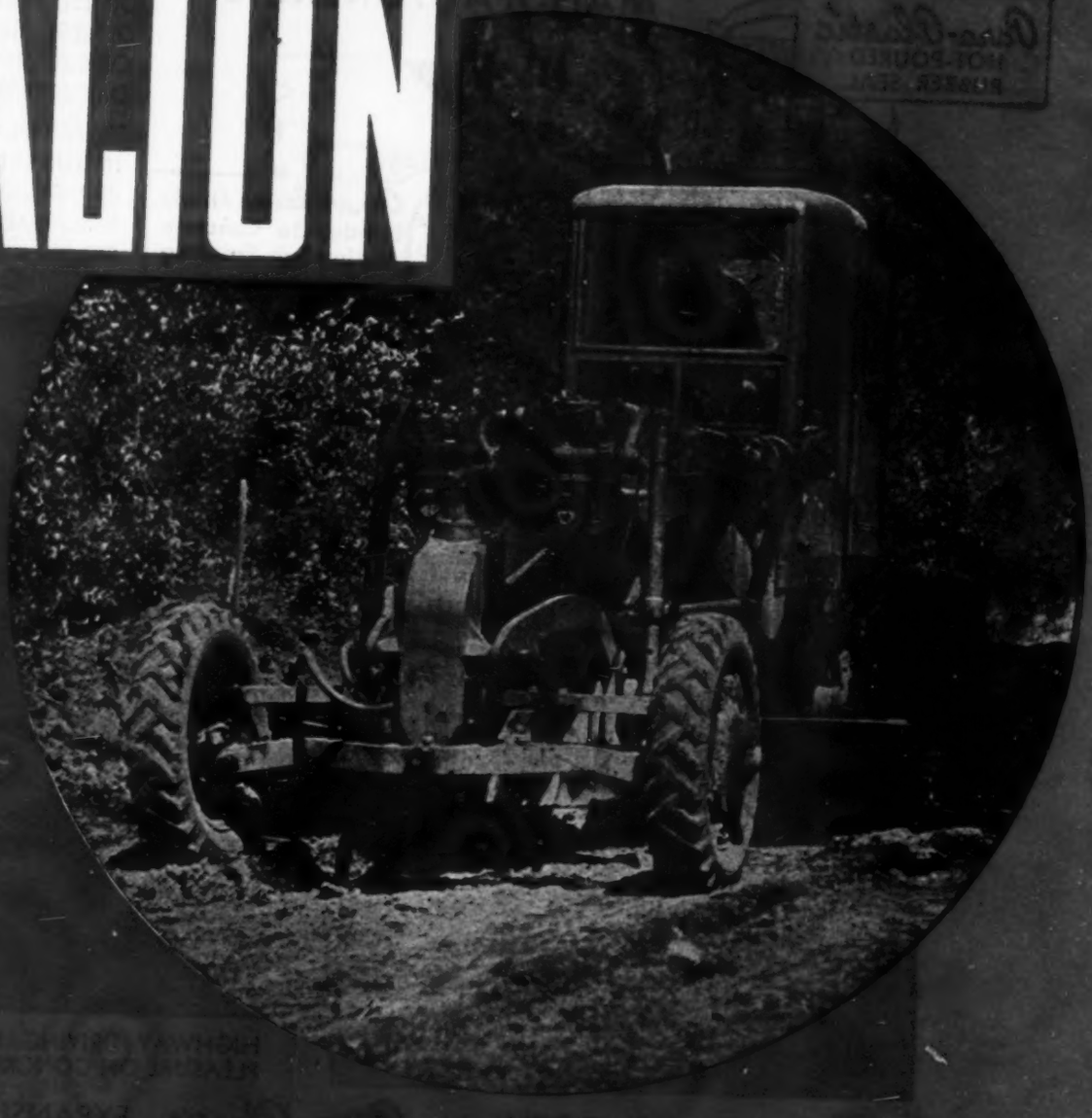
TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA, NEW. YORK

GALION

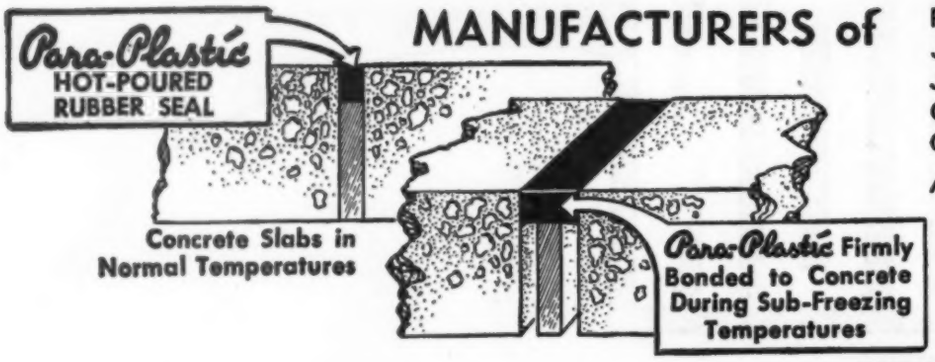
for Plus Value in MOTOR GRADERS



● Designed by road machinery experts to handle the variety of work now expected by the modern motor grader, you'll find that Galion offers a lot of plus values in a line of versatile motor graders. Let us tell you more about them and how they will work into your postwar plans—in all kinds of road and airport construction projects.

Left below—Blade adjusted for high bank cutting. Can be set at any desired angle up to 90 degrees below—Blade adjusted for shoulder work. Reach is approximately 72" outside of path of rear wheels. Also adjustment for ditching, low bank cutting and for working backward. Catalog No. 285.

The Galion Iron Works & Mfg. Co., Galion, Ohio



MANUFACTURERS of

PREMOULDED EXPANSION JOINTS; FELT-SIDED ASPHALT JOINTS; SELF-EXPANDING CORK JOINTS; FELT SIDED AND CORK JOINTS; FIBER JOINTS...

ASPHALT PLANK for—
INDUSTRIAL FLOORING;
BRIDGES AND BY-PASSES,
RAILROAD TRACK FILLER,
ETC.; ETC.; ETC.

— Para-Plastic —
EXPANSION JOINT SEAL
EXTENDABLE—MAINTAINS
BOND at 0° F.

HIGHWAY DRIVING IS A REAL PLEASURE ON CONCRETE ROADS

MADE SAFE and SMOOTH with Para-Plastic EXPANSION JOINTS

1.

2.

3.

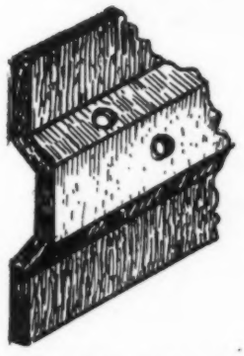
THREE TESTS: PROVING PLIABILITY OF Para-Plastic IN COLD WEATHER

1 — PARA-PLASTIC Compound Frozen in Solid ICE.
2 — Still PLIABLE, easily BENT or TWISTED.
3 — In few Minutes—RESUMES Normal SHAPE.

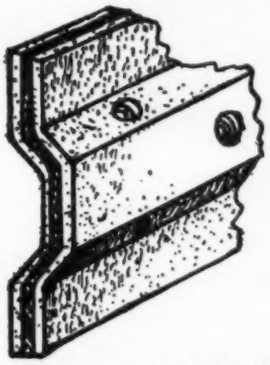
SERVICISED PRODUCTS CORP.
6051 West 65th Street, Cnicago, Ill.

SERVICISED: CONTRACTION JOINTS AND DUMMY JOINTS

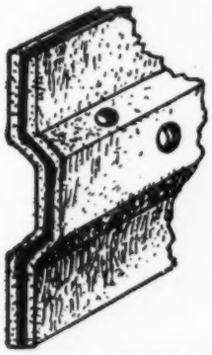
PATENT No. 2,370,153. OTHER PATENTS PENDING.



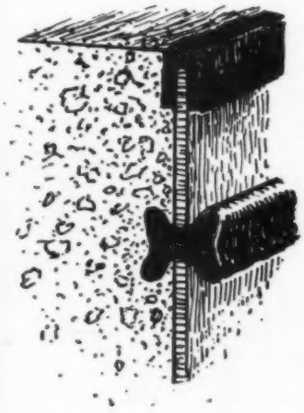
A rigid mastic joint with waterproofing paper sides, punched for dowels and staking. Also prepared with Para-Plastic for better waterproofing of the crevice.



A wood veneer core for interlocking of slabs having felt sides cemented thereto with Para-Plastic which upon oozing will waterproof the top and bottom of the center strip.



Light steel center strip faced on either side with Para-Plastic and felt sides. Sufficient coverage of material to cause slight oozing above and below the plate in order to cause the Para-Plastic to adhere to the walls of the concrete and waterproof the space above and below the joint.

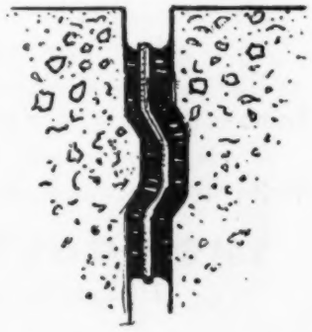


Special keying device formed of Para-Plastic mounted in place by rigid board and capped with Para-Plastic crown.

Para-Plastic

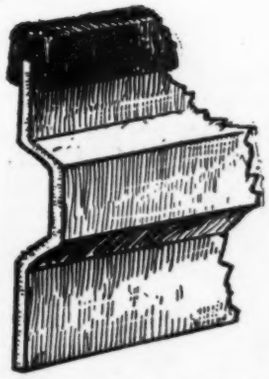
— EXTENDABLE — MAINTAINS BOND at ZERO

© 1945

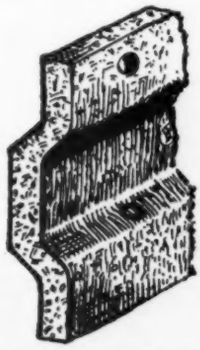


Steel center strip coated with Para-Plastic prior to laying in cement. Absolutely water-proofing the crevice in case of contraction.

Asbestos cement tongue-and-groove strip prepared from the same material from which asbestos shingles are formed. Can be water-proofed or not as desired.



Economical steel center strip having less steel than ordinary. The top ridge having mounted thereon a Para-Plastic crown.



Center strip formed and pressed from sawdust, having synthetic resin binder. Can be water-proofed if desired.

SERVICISED PRODUCTS CORP.

6051 W. SIXTY-FIFTH STREET, CHICAGO 38, ILL.

the Job— Laying 103,500 cu. yd. of concrete in a hurry

the Equipment — Three Multi Foote 34 E Pavers

BUILDING one of the longest and best constructed airport runways in the country, 8500 feet long, 200 feet wide, and 12 inches thick, and laying other necessary surfacing for handling 175,000-lb. wheel loads for a total of 103,500 cu. yd. of concrete is one of the more recent jobs finished in record time by three Multi Foote 34 E Pavers. The average concrete production was 1560 cu. yd. for a ten hour shift, with a high day of 2258 cu. yd.

Records like this for paving airports and roads are everyday production for Multi Foote Pavers because every feature is built for better mixing and faster charging and discharging. Double cone drum with its end-to-end scouring action insures a complete and thorough mix of every batch. Rotary discharge takes only a quarter turn to pour concrete into the big bucket ready to speed out the long boom to be discharged. One of the most important features of every Multi Foote is the high operating platform which provides greater visiblity for faster, more accurate work.

Write direct or ask your Foote dealer for details.

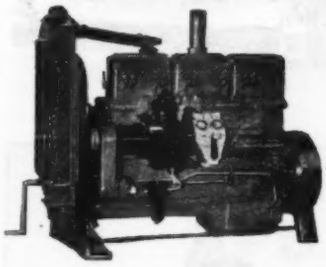
THE FOOTE CO., INC.
1936 State Street, Nunda, N. Y.

ARMY NAVY

MULTIFOOTE
CONCRETE PAVERS

Model H Cummins Diesel is offered in both four and six-cylinder arrangements, developing maximum output of 100 and 150 hp., respectively. This engine is manufactured in a complete line of industrial and automotive models, such as the Model HP-600 power unit, shown above, and Model HBI-600, right, for wheel or track-mounted equipment.

☆ ☆ ☆



The Model HIP-600 is an open type power unit incorporating the same basic engine as that described above. It has a 4⅞" bore and 6" stroke, the six-cylinder unit having a piston displacement of 672 cu. in., and the four-cylinder, 448 cu. in.

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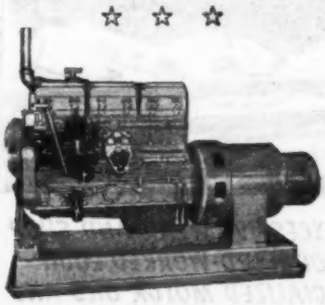


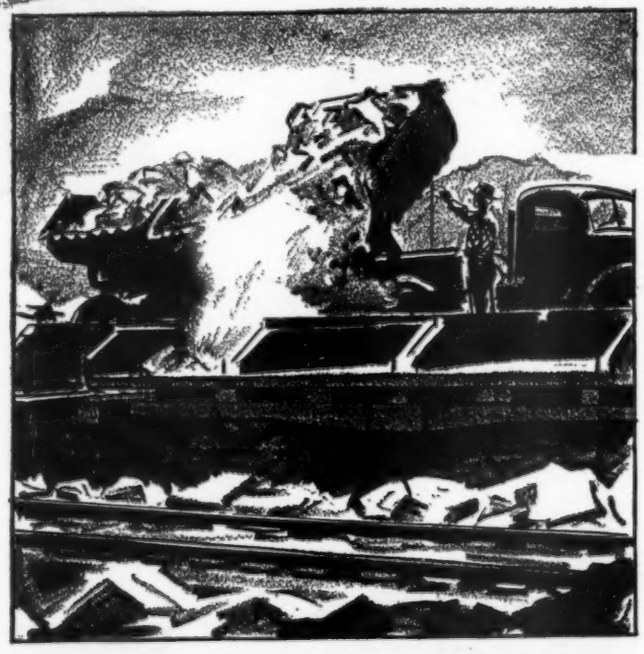
The Model HGA-601 is an AC generating set, rated 50 kw. at 1200 rpm. The four-cylinder Model H generating set is rated 30 kw. at 1200 rpm. Both four and six-cylinder sets are also available for DC operations.

A look at the Cummins Diesel's long record of profitable performance in all types of heavy-duty earth moving and material handling equipment proves that—in the construction and aggregates industries—one diesel does the complete job! In trucks, shovels, compressors, rock crushers, dredges and virtually every other type of equipment—rugged, flexible, economical Cummins Diesel power has consistently demonstrated its ability to get the job done in less time . . . at a lower cost. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.

Do you know that . . .

AMERICAN AIRLINES INC. UNDER CONTRACT TO THE AIR TRANSPORT COMMAND HAS MADE MORE THAN 4300 TRANSATLANTIC CROSSINGS . . . FOR LUBRICATION OF ITS GREAT FLAGSHIP FLEET, AMERICAN USES SINCLAIR PENNSYLVANIA MOTOR OIL.

CRUDE OIL AND FINISHED PRODUCTS TRANSPORTED DAILY THROUGH THE SINCLAIR PIPELINE SYSTEM WOULD FILL 318,400 55-GALLON DRUMS. THESE, STACKED END ON END WOULD BE 31 TIMES HIGHER THAN MT. EVEREST. SINCLAIR USES OLDEST CRUDES TO MAKE HIGHEST QUALITY LUBRICANTS.



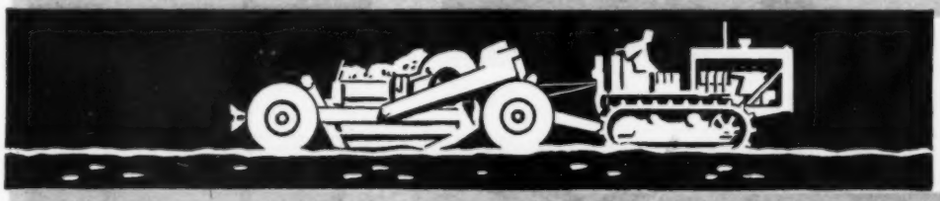
PROTECTION AGAINST EXCESSIVE WEAR AND SHOP LAY-UPS IS PROVIDED FOR HARD-WORKED EQUIPMENT BY SINCLAIR SPECIALIZED MOTOR OILS AND GREASES. TEN-OL 200 IS A NEW OIL FOR BETTER LUBRICATION OF DIESEL-POWERED EQUIPMENT.

SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

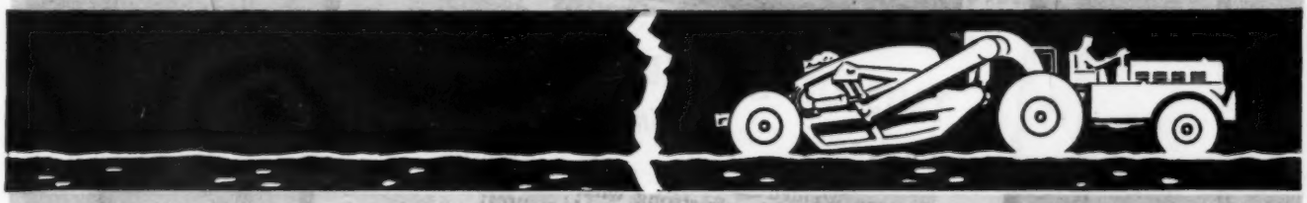
FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

ZONE YOUR EQUIPMENT FOR LOWEST COSTS ON EARTH

ZONE 1 "Caterpillar" Diesel track-type Tractors, with bulldozers and rippers



ZONE 2 "Caterpillar" Diesel track-type Tractors, for loading and pulling scrapers



ZONE 3 "Caterpillar" Diesel wheel-type Tractors, for high-speed hauls

MOST big contracts today call for a variety of equipment. A bulldozer, for instance, is your number one work tool. But you wouldn't attempt to do the whole job with bulldozers.

TAKE tractor-scrapers, too. In bidding on a big job, there are many factors to be weighed. How long will the hauls be? What kinds of material have to be handled? What is the total yardage? Are there stiff grades to climb? What shape are the haul roads in? And how fast must the job be done to avoid penalties?

Tracks? Rubber? Or Both? All the way from chunking out the right-of-way to finishing the grade, track-type tractors are indispensable on a large part of any earthmoving job. And there is a definite place for rubber tires, as well. Their greatest usefulness is on longer hauls, over good haul roads. To get the job done efficiently, on time, and at lowest cost per yard, you need *both* track-type and wheel tractors.

"Caterpillar" Job Analysis. Your "Caterpillar" dealer knows earthmoving costs, and he knows machines. Because he sells both kinds of "Caterpillar" Diesel Tractors—tracks and rubber—his judgment of your problem is fair and unbiased.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

TRUSCON WELDED STEEL FABRIC

for long-lasting, economical highways!

Truscon Welded Steel Fabric is a permanently bonded mesh of tremendously strong wire, that imparts great strength and long life to concrete. It assures:

Resistance to cracking during setting period.
Tensile strength against subgrade friction.
Resistance to cracking due to warping.
Resistance to development and opening of cracks.
Resistance to slab separation.
Decrease of spalling and disintegration.

Ask experienced Truscon highway engineers to help you design and build better roads for communities you serve.

TRUSCON STEEL COMPANY • Youngstown 1, Ohio
Subsidiary of Republic Steel Corporation

TRUSCON
WELDED STEEL FABRIC
• *Covers the Continent* •

They're
"BLACKHAWK HYDRAULIC EQUIPPED"

POWER-DRIVEN P-104 Power-Packer Pump —belt or gear driven —control valve is operated from cab. Compact, easily installed.

HAND OPERATED P-60 Power-Packer Pump —mounts in cab. Blackhawk is also the source for RAMS and VALVES for use with these pumps.

LONG before the war, leaders in many fields, whose trademarks you respect, proved the remarkable efficiency of Blackhawk Hydraulic Controls.

Today, Blackhawk Power-Packer HYDRAULIC Units are proving their many advantages to an extent far beyond pre-war conceptions . . . forecasting still greater achievements in the postwar era to come . . . Specify "Blackhawk Hydraulic Controls" when modernizing or buying equipment . . . For complete list of advantages, write your equipment manufacturer—or write us direct.

BLACKHAWK MFG. CO. Dept. RS **Milwaukee 1, Wisconsin**

BLACKHAWK

Hydraulic Equipment

REINFORCING
the nation's concrete roads

WHY is *one brand* of wire fabric so widely used in reinforcing concrete roads?

Because engineers and contractors know that American Welded Wire Fabric is the ideal material for concrete reinforcement.

They have proved their preference by installing millions of square feet of this high-yield-point, cold-drawn, welded wire fabric in trunk highways, roads and streets all over the country.

Easily handled, quickly installed, this steel backbone of concrete enables the slab to withstand impact, stresses and strains in every direction.

This practical, economical reinforcement lies flat, stays in place. On jobs where American Welded Wire Fabric is used for reinforcement, construction time and costs are reduced — a safe, long-lasting pavement is assured.

We shall be glad to consult with you on concrete reinforcement problems and to send you detailed information on American Welded Wire Fabric. Write today, without obligation.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

USS STEEL

AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL

See for Yourself THE MOST ADVANCED LINE OF AIR COMPRESSORS IN AMERICA

Built to Aircraft Engine Standards, by Engine Builders' Precision Methods and Machines

Sizes 60 to 500 Cu. Ft.

Trailer, Truck, Tractor and Stationary Mounted — Gas, Diesel and Electric Power

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More Air from Less Fuel —new standards of economy.

Force feed lubrication, lifetime construction, "ultra-lapping" and many other advanced features IN THE MOST BEAUTIFUL LINE OF AIR COMPRESSORS YOU'VE EVER LAID EYES ON.

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CONCRETE HIGHWAY NEWS

Universal Atlas Cement Company (United States Steel Corporation Subsidiary)
Chrysler Building, New York 17, N. Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco

NEW SCIENTIFIC CURB TO PROTECT POST-WAR DRIVERS

WHITE CONCRETE REFLECTING CURB MADE WITH ATLAS WHITE CEMENT PROVIDES PERMANENT SAFETY GUIDE

SIX YEARS OF USE

PROVE VALUE OF ATLAS DURAPLASTIC* AIR-ENTRAINING PORTLAND CEMENT

Experience of scores of engineers and contractors on over 2½ million sq. yds. of road, street and airport paving in many states and cities shows that Atlas Duraplastic—

- **Makes the concrete more plastic, more workable, more uniform and more durable.**
- **Requires less mixing water for a given slump.**
- **Spreads, screeds and finishes more easily.**
- **Minimizes segregation and bleeding or "water-gain."**
- **Fortifies the concrete against the action of freezing and thawing weather.**
- **Makes the concrete highly resistant to the scaling action due to use of de-icing salts.**

Write for further information on the development and use of Atlas Duraplastic, the air-entraining portland cement originated and developed by Universal Atlas to make concrete more durable and more plastic.

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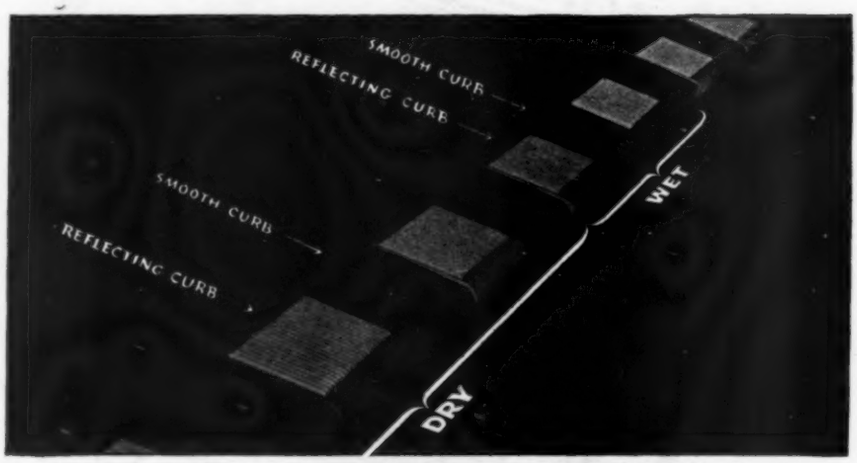
RS-CD-7



Night view of test section of smooth white and reflecting white curb in which all sections are made of identical white materials. Smooth sections when dry appear gray, and when wet appear black, and hence are almost invisible. In strong contrast, reflecting faces when dry are bright, and when wet are brighter still and hence even more visible.

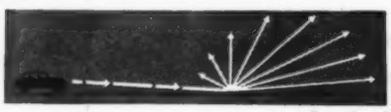
BECAUSE curb defines the road's edge, it is the driver's guide to safety.

Whether for new or old roads, White Concrete Reflecting Curb, made with Atlas White Cement, provides the answer for safer post-war driving. Its light color distinguishes it from the darker pavement, and at night its saw-tooth face reflects the light from the driver's headlamps back to the driver and hence makes the curb highly visible.

On rainy nights when visibility of smooth curb is almost nil, the film of water on White Concrete Reflecting Curb makes it an even better reflector. This increases its visibility just when visibility is most needed.

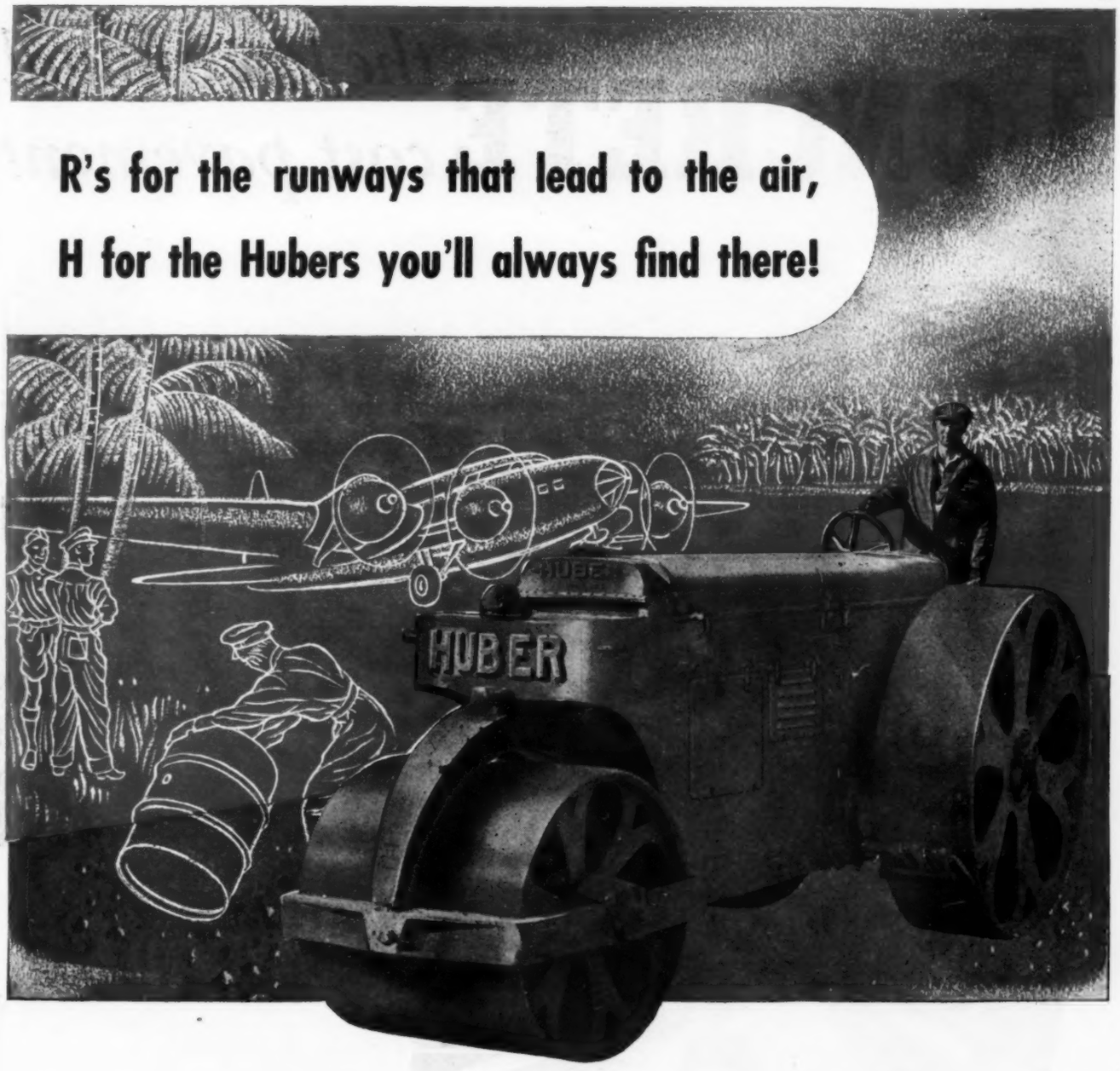
Write for further information on White Concrete Reflecting Curb made with Atlas White cement. Ask for the book, "A White Guide to Safety."

A smooth curb (left) wastes light . . . reflects it up and away from the driver. A White Concrete Reflecting Curb (right) conserves light . . . reflects it back to the driver. A smooth curb is barely visible at night; a White Concrete Reflecting Curb stands out—bright and clear.



UNIVERSAL ATLAS CEMENTS

UNIVERSAL PORTLAND • ATLAS PORTLAND • ATLAS WHITE • ATLAS DURAPLASTIC • ATLAS HIGH-EARLY

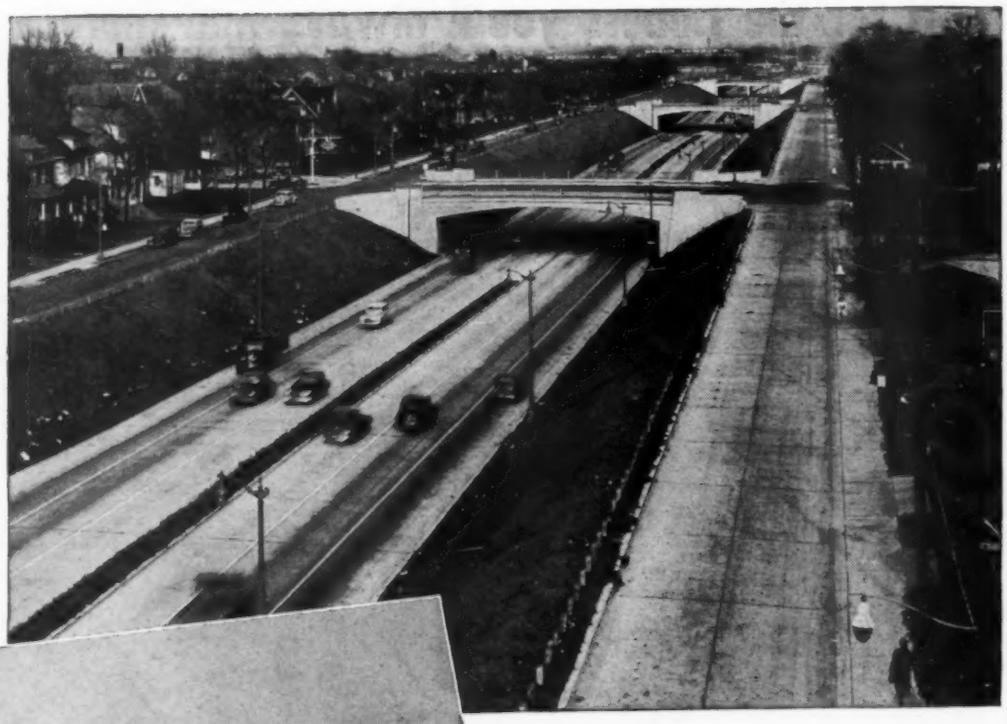


Yes, sir, you'll find Huber Rollers busy all over the world on airstrip construction and maintenance . . . smoothing the take-offs and landings of our military aircraft . . . and bringing closer the day we can start delivering these new and improved Hubers to you.

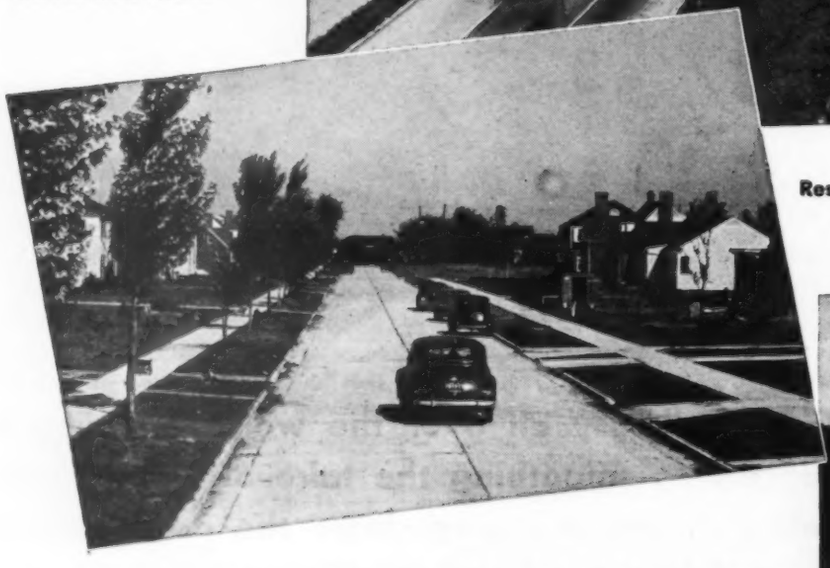
THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER ROLLERS

CONCRETE *the low annual cost pavement*



Davison Limited Access Highway, Detroit. *10-in. uniform cross section.*



Residence street in Saginaw, Michigan. *7½-5-7½ in. cross section.*

State highway in Oklahoma carrying moderately heavy rural traffic. *9-6-9 in. cross section.*

Accurate formulas enable engineers to design portland cement concrete pavements to carry any predicted volume and weight of traffic at lowest maintenance expense. This plus the fact that concrete, for all but the lightest traffic roads, usually costs less to build than any other pavement of equal load-carrying capacity, means low annual cost, the true measure of pavement economy.

PORTLAND CEMENT ASSOCIATION

Dept. A3-28, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

PORUS-KROME

Long Life Liners for Streamliners

Sleek, powerful and modern though the Streamliners are, there is a spot that is vulnerable to wear . . . the cylinder liners and rings of their rugged Diesel engines. Or rather, the liners are vulnerable to wear *unless they are long life liners treated with* PORUS-KROME, which reduces wear and multiplies the life of the liners and rings.

That is why one large manufacturer of Diesel engines for Streamliners and other applications has standardized on PORUS-KROME liners for all engines coming off the production line. And that is why other engine manufacturers are planning to use PORUS-KROME in their engines as soon as they can again build engines for civilian use. It enables them to offer their customers engines of greater reliability and longer life . . . and lower maintenance costs.

And what is PORUS-KROME?

PORUS-KROME is hard, pure chromium which is applied to cylinder bores by the patented Van der Horst process. It has tiny pores and channels in its surface which serve as reservoirs for lubricating oil, feeding it back to the surface as needed. It reduces corrosion and wear and multiplies cylinder life 4 to 20 times, and ring life 3 to 4 times.

If you want engines of greater reliability and lower maintenance costs, write today for detailed description of PORUS-KROME and how you can get its advantages in your engines.

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST

U. S. PATENTS 2,048,878 AND 2,314,804

VAN DER HORST CORPORATION OF AMERICA

AN AFFILIATE OF DRESSER INDUSTRIES

OLEAN • NEW YORK
CLEVELAND 11 • OHIO

What do you want to know about *Re-treatments* with Tarmac P ...or Tarmac A

When they are used—

For providing new surface courses and to save the pavement from the destructive action of traffic.

Why Tarmac is recommended for them—

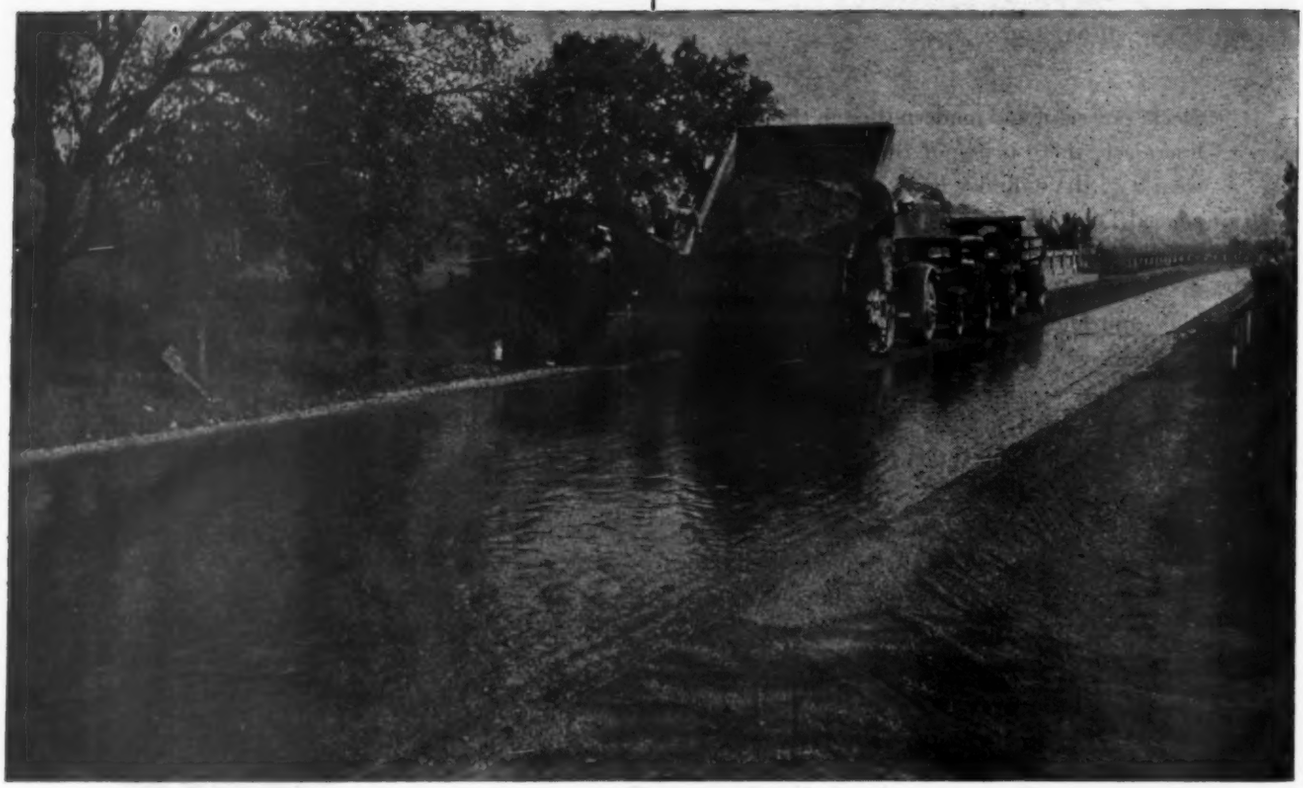
Tarmac livens up the old surface, binding the old and new together in a tough, skid-resistant, durable wearing course. Tarmac A is used when the surface is open or when a thicker surface course is preferred.

How they are constructed—

Complete construction steps given in Tarmac Handbook, or in booklet, "Surfacing with Tarmac."

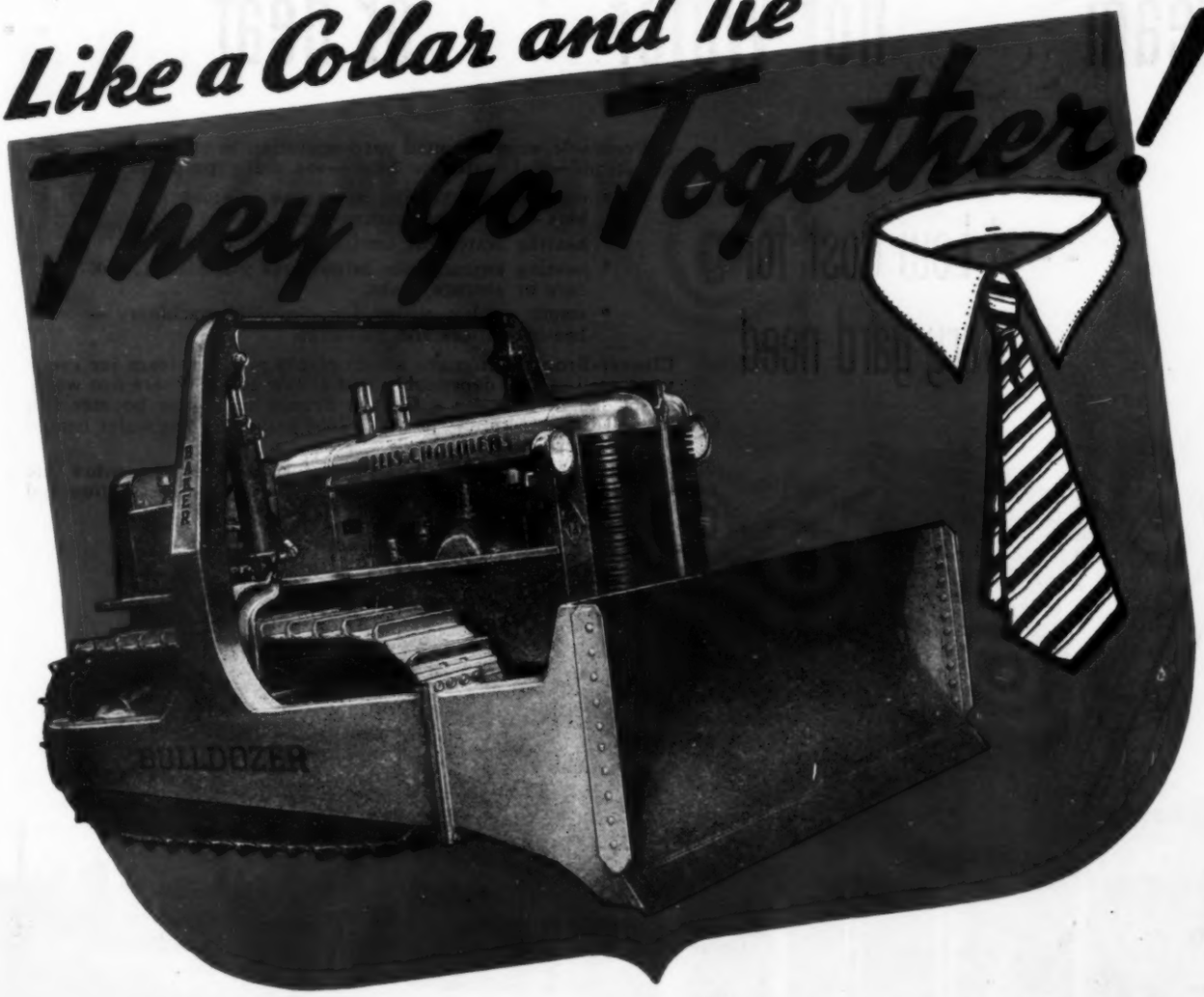
PROPER MAINTENANCE CONSERVES MANPOWER

BUY WAR BONDS—
AND KEEP THEM!



KOPPERS COMPANY, INC. — TAR AND CHEMICAL DIVISION
PITTSBURGH 19, PENNSYLVANIA

Like a Collar and Tie They Go Together!



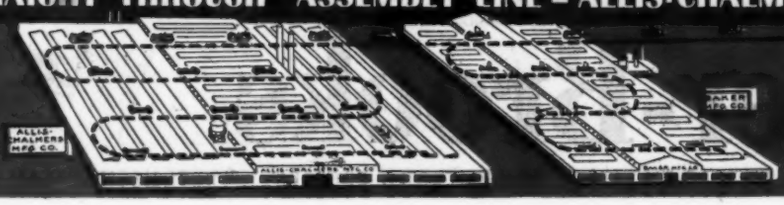
Baker bulldozers and gradebuilders are not adapted to—they're built specifically *for*—Allis-Chalmers tractors. They go together as snugly as a collar and tie. Look good together too! You get greater efficiency from your A-C power by using Baker equipment.

Since the introduction of the first A-C crawler tractor—over two decades ago—Baker has designed and built hydraulic bulldozers for every model A-C tractor as it was introduced. There's a model of Baker bulldozer and gradebuilder for every model of A-C crawler tractor. Today Bakers are predominantly favored by users of A-C tractors — because these users have found that *they go together!* Bakers are sold *exclusively* through Allis-Chalmers industrial tractor dealers.

THE BAKER MFG. CO.
506 Stanford Ave., Springfield, Ill.

If it concerns Victory, it concerns us!

"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

Steam Hot Water or Heat ..

-- at Low Cost for every yard need

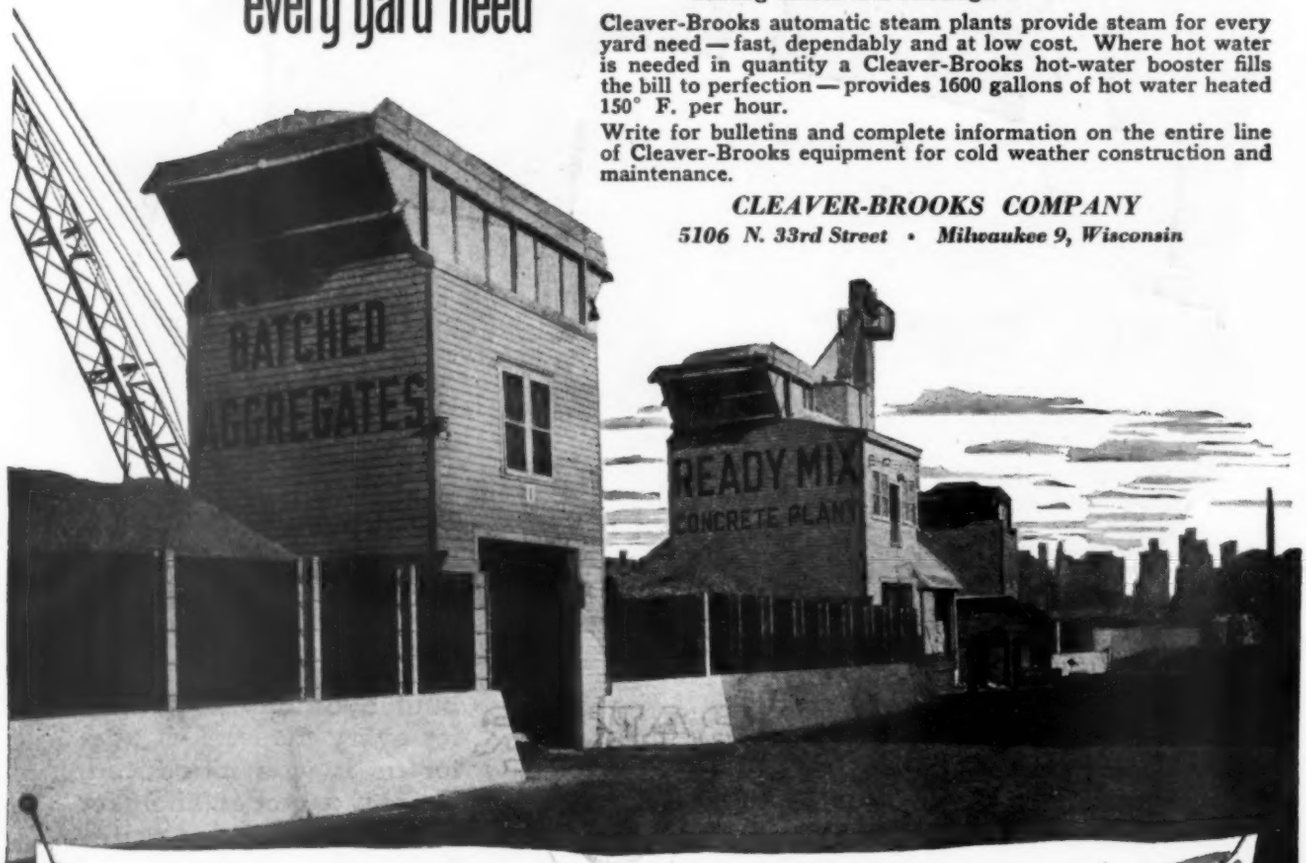
● Profitable, uninterrupted yard operation in cold weather calls for steam — hot water or heat — for many purposes.

- thawing and heating aggregate in stock piles or bins — for winter concreting.
- heating water for central mixing plants.
- heating asphalt, oils, bituminous material in tank cars or storage tanks.
- steam or hot water for cleaning machinery — heating offices and buildings.

Cleaver-Brooks automatic steam plants provide steam for every yard need — fast, dependably and at low cost. Where hot water is needed in quantity a Cleaver-Brooks hot-water booster fills the bill to perfection — provides 1600 gallons of hot water heated 150° F. per hour.

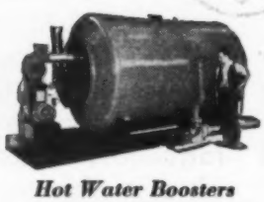
Write for bulletins and complete information on the entire line of Cleaver-Brooks equipment for cold weather construction and maintenance.

CLEAVER-BROOKS COMPANY
5106 N. 33rd Street • Milwaukee 9, Wisconsin



Automatic Steam Plants

Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.



Hot Water Boosters

Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 150° F. per hour.

Portable Pumping Boosters

Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.

Portable Tank-Car Heaters

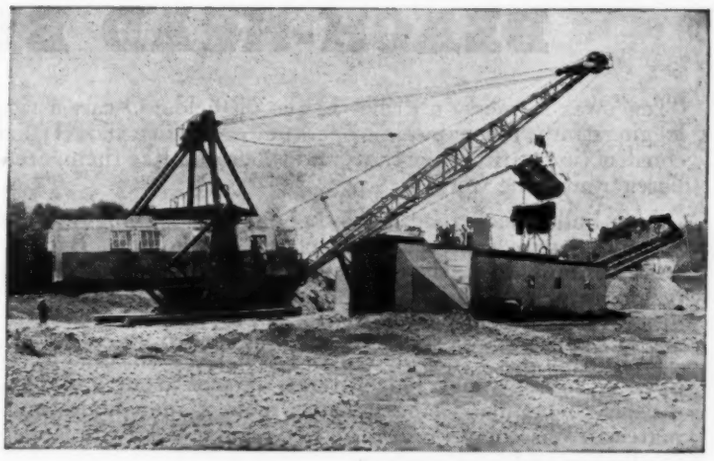
Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of ★TANK CAR HEATERS ★BITUMINOUS BOOSTERS ★AUTOMATIC STEAM-PLANTS

With this New Clutch
YOU CAN SAVE

1. Space
2. Maintenance
3. Repair Cost
4. TIME



The FAWICK Airflex Clutch

1. Saves Space because it is compact and requires no springs, arms or toggles. It controls power by air.
2. Saves Maintenance because it requires no adjustments, no lubrication. Even corrects automatically for misalignment.
3. Saves Repair Costs because there are no parts to break or wear out. Has torsional flexibility—absorbs shocks and vibration.
4. Saves TIME because it permits dependable *full-time* operation, in the heaviest service.

• • •

The Fawick Airflex Clutch has proved its performance in hundreds of Naval vessels under combat conditions—and for heavy-duty drives throughout industry.

Ask our Engineering Department for recommendations.

FAWICK AIRFLEX COMPANY, INC. • 9919 Clinton Rd., Cleveland 11, Ohio

In Canada, Renold-Coventry Ltd., Montreal, Toronto, Vancouver

In Britain, Crofts Engineers, Ltd., Bradford, England

FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

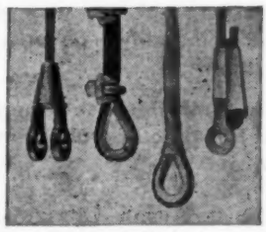
BEACH-HEAD BULL SESSION

"Tex" was formerly a driller in the oil fields; Oscar, a rigger in a logging camp; Joe, a dragline operator; and Bill, a shovel runner for a construction outfit. Now they, and thousands like them, are building bases 'round the world.

In a bull session they'll gripe about lots of things—but mention *pre*formed wire rope and they change their tune. Back home, in scores of industries, they learned an affectionate respect for its dependability. And on foreign soil, with supplies hard to get and time at a premium, stout wire rope is doubly vital.

WISSCOLAY *Pre*formed Wire Rope, manufactured by Wickwire Spencer, not only lasts longer, but it's easier to cut, splice and install —safer to handle. Using it saves money, man hours and critical material. Wisscolay *Pre*formed, like regular Wickwire Rope, is made in all sizes and constructions.

If you have a wire rope question our wire rope engineers will be glad to be of service. Call or write our nearest branch office or Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, New York.



WHICH ATTACHMENT IS BEST?

The proper types of attachments and applications are two of the many useful ideas you'll find in "Know Your Ropes." This 82-page book contains 78 "right and wrong" illustrations, 40 wire rope life savers, 20 diagrams, tables, graphs and charts. It can help make your present wire rope last longer.

SEND FOR YOUR
FREE COPY TODAY

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene • Boston • Buffalo • Chattanooga • Chicago • Clinton (Mass.) • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester

ASPHALT - AGGREGATE ADHESION AS IMPROVED BY CHEMICAL ADMIXTURE

Case No. 1

*AGGREGATE CAN BE WET OR DRY

"We wish to inform you that last Winter we applied on penetration work approximately 50,000 gallons of 115 penetration asphalt treated with your **NOSTRIP** compound. Much of this material was applied below freezing temperature and all of it was applied under **wet and adverse weather conditions.** We obtained perfect adhesion, and there has been no evidence of the stripping of asphalt from the aggregate. Without the use of your **NOSTRIP** compound this work could not have been completed during the Winter months."

*Above is an excerpt of a letter from a Rhode Island contractor. Name on request.

your first drum

is our best salesman!

THE ALL-YEAR ROAD MATERIAL

NOSTRIP

AN ADMIXTURE FOR TAR AND ASPHALT

MAGUIRE INDUSTRIES, INCORPORATED • NOSTRIP DIVISION • 122 E. 42nd ST. NEW YORK. 17. N.Y.

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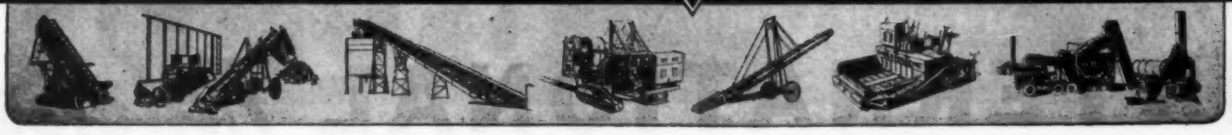

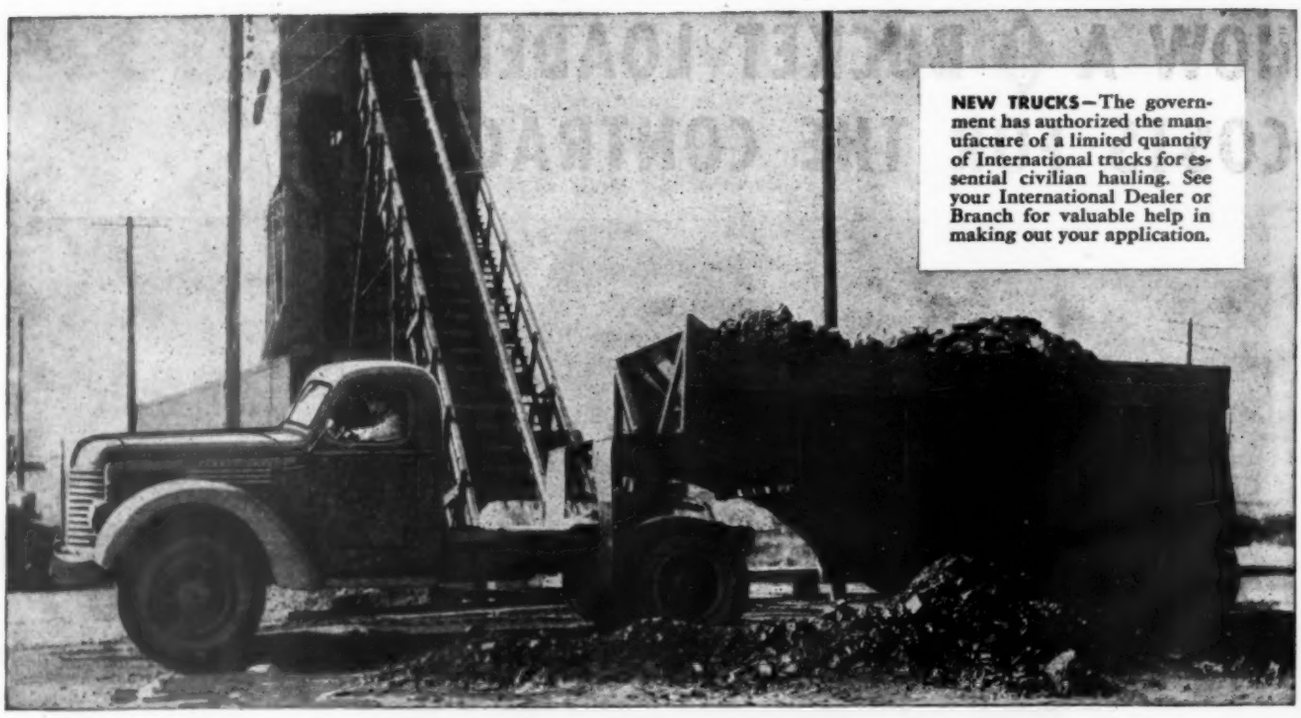

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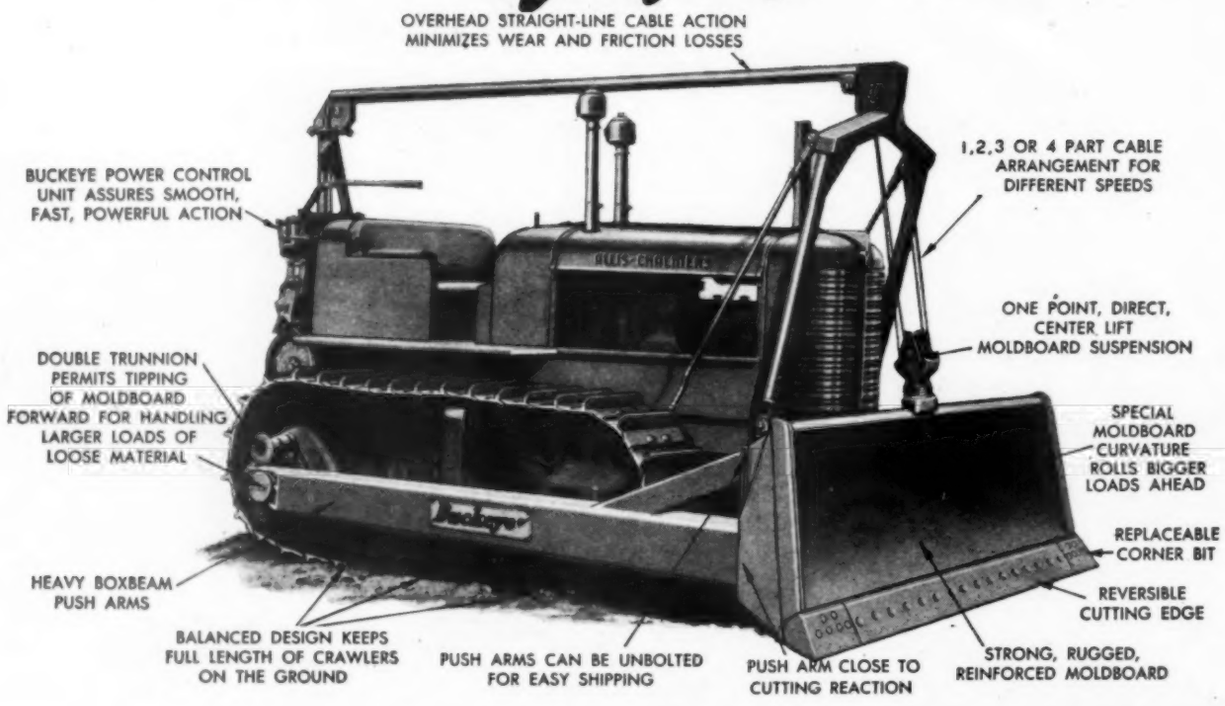
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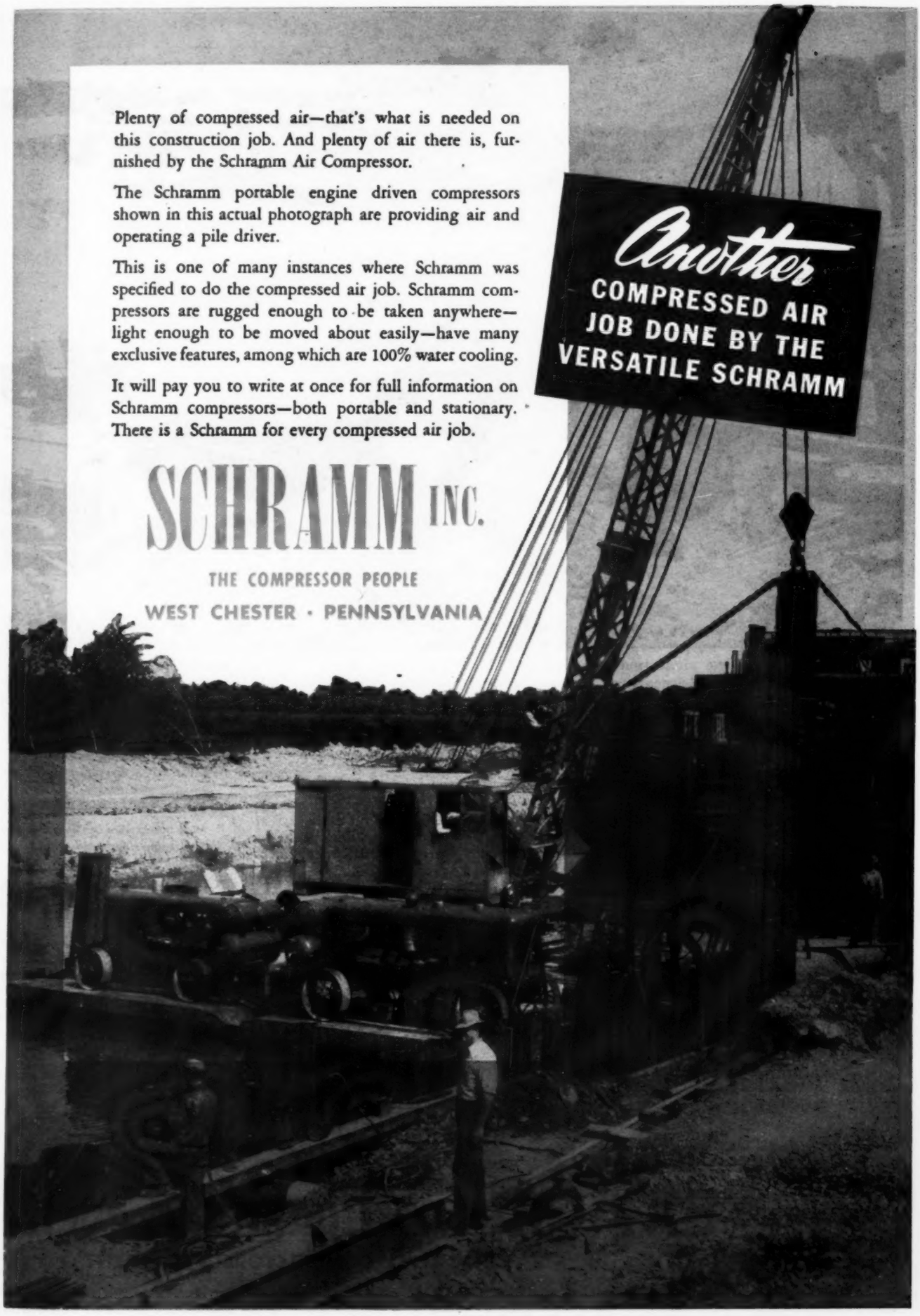

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ROADS AND STREETS

March, 1945, Vol. 88, No. 3

Paving Methods at Marine Air Station

Paver sequence designed to accommodate existing traffic; dowels installed by special machine; light vibrating screed used to reduce labor in paving 1200 x 1800 ft. apron

HOW to grade and pave two new runways lying closely parallel to existing runways, without interrupting plane traffic at any time, was one of the construction problems in expanding the El Toro Marine Corps Air Station in Southern California. Macco Construction Co. of Clearwater, Calif., one of 10 prime contractors and 8 subcontractors, had a $1,300,000 contract for runways and taxiways, with Western States Construction Co. of Los Angeles as sub on grading.

Grading was relatively shallow, involving 200,000 cu. yd. on the field proper. But a peculiar drainage problem existed due to the fact that the field, located at the base of foothills, slopes 170 ft. in one general direction across two miles of field width. While subsurface drainage was a simple matter, handling surface run-off required constructing extensive gunite-lined open ditches around the area, and numerous check dams. A triple 9 x 18 ft. box culvert 565 ft. long was required under one runway, and in the process of getting proper gradients to the buried drains, one 36-in. line had to be trenched 26 ft. deep.

All-rubber-tired high-speed scraper units moved the bulk of the yardage, this type of equipment being dictated by the necessity of long hauls around the ends of existing runways and quick movement across existing runways, where such was permitted. In order to minimize haulage across runways considerable quantities of excavation which normally would have been moved directly into fill were wasted, and filling done from adjacent borrow areas.

Two tractor-scraper units aided on short hauls, one a contractor-designed unit consisting of a 10-yd. scraper pan hitched behind the chassis of a 10-tired truck. Sheepsfoot and pneumatic rollers furnished compaction.

A large hillside pit located immediately adjacent to the field supplied 450,000 tons of select material for 12 in. of rolled ballast under runways.

Behind the tamper and spreader the contractor is shown here using a bridge-type mechanical dowel setter. Dowel assemblies are pressed into the concrete at contraction joints with help of vibration

Two 34-E dual drum pavers served by 4-batch trucks placed a maximum of 1350 cu. yd. of concrete per day (one shift). See also bottom of page

Note special boom on this paver, used to carry water lines over the construction lane

This pit was equipped with two heavy dozers pushing down to a hopper, the material going through a screen to eliminate oversize, then by belt to a stockpile, and through a second hopper and belt to a loading pit.

Pavers Had to Hop Around

New paving consisted of two 250-ft. concrete runways 7,000 and 8,000 ft. long and several hot-mix asphaltic concrete taxiways. A novel sequence of paving areas was adopted to obtain maximum yardage without interfering with traffic on existing parallel runways.

Runways were built 8 in. thick, tapered to 10 in. at outer edges and keyed but not thickened at longitudinal lane joints.

Paving was done in 25 ft. lanes. The scheme was to concrete all alternate lanes in area No. 1 (layout not shown for security reasons), then move and do the same in area No. 2, and so on through to area No. 7, but coming back to fill all the in-between lanes in previous areas as soon as the first concrete had hardened sufficiently to hold up equipment.

Two 34-E dual pavers were used, served by 4-batch trucks. The pavers were followed by a screw-type spreader, tamping finisher, special dowel setting machine, joint machine and hand floats. The flanged wheels on all finishing units were equipped with flat, hard-rubber-tired extensions to protect adjacent concrete against spalling.

Of special note was the dowel machine, developed for this and similar jobs by another west coast contractor (see photo on first page). Since dowels were specified for all dummy joints (15 ft. spacing), dowel placement threatened to be a laborious task. Greatly speeding this work, eliminating chairs and doing a neat job of placing dowel assemblies, this machine consisted of a bridge equipped with hydraulically operated thrust arms which vibrated and pressed the dowels down to proper position and level after the concrete had been rough finished.* The dowel setter was subsequently moved to Macco's extensive North Island navy base contract at San Diego.

Maximum production of 1350 cu. yd. of concrete per day (one shift) was obtained on concrete runways. Cylinder breaks at 28 days averaged 4,480 lb. per sq. in. for 5½-gal. concrete made with combination crushed stone and gravel.

Basich & Price Employ Lightweight Finishing Equipment

On a million dollar contract for utility lines and other field improvements Basich & Price here had the job of paving one of the largest concrete industrial areas of any field on the Coast. An area 1200 x 1800 ft. was paved in sixty 25-ft. lanes. In order

*Editor's Note: While approved by the U. S. Navy Bureau of Yards and Docks this type mechanical dowel setter is not approved by the California State Highway department or U. S. Engineers. Some authorities fear that dowels will not always be true, and theoretically vibration causes oil to be washed off of slippage end of dowels and a film of wet mortar to be formed around each dowel leading to slight subsequent settlement of dowels before concrete hardens. The Washington state highway department developed a similar machine experimentally several years ago.

to reduce labor and time of moving finishing equipment, L. M. Price who managed the work, employed a commercially made lightweight vibratory screed which could be picked up by four men or if necessary only two. This unit consisted of an air-cooled gasoline motor driven (1½ h.p.) unit mounted on a composite steel and screed strikeoff. Used sometimes in conjunction with a mechanical spreader, at other times with hand spreaders, it was seesawed or dragged forward while vibrating under pressure. Satisfactory compaction and density of concrete were obtained while eliminating nearly all hand floating. Basich & Price's pavement finishing crew using this vibrator screed consisted of four spreaders, two joint men, one of whom operated the screed, two float men, two finishers and a spray operator.

The pavement design included molded rubber expansion joints and asphalt impregnated paper dummy joint strips.

Peter Kiewitt also performed walk and area road construction and resurfacing under a separate contract which consisted mainly of utility, water and sewage plant installation.

The 1944 El Toro Marine Corps Air Station project, including paving, was under the Eleventh Naval District, Capt. A. K. Fogg, officer in charge, and Commander R. Fowler, contract superintendent. Personnel at the field included Lt. Commander G. C. Lindeberg, resident officer in charge; Lt. (j.g.) J. C. Raleigh, Lt. M. C. Lapota and L. L. Sibley, ass't resident officers; Cecil M. Smith, project manager; Ralph Birdno, field engineer; Orville Stolt, office engineer; Jim Isbell, supervising surveyor.

26% P-W Road Cost to Go for Labor at Site

About 26% of the $1,000,000,000 annual expenditures under the postwar federal-aid highway program will be for labor at the construction sites, according to statistics released by the Associated General Contractors of America.

One of the chief purposes of the program is to provide postwar employment, and the AGC estimates that it will provide annually 95,750 man-years of direct on-site labor, and 215,600 man-years of indirect off-site labor, based on 1940 prices. Expenditures for materials would total about $443,000,000 per year or about 44%.

The total business activity resulting from this work, involving transactions in handling and processing materials and in road equipment, is foreseen to run to $3,000,000,000 a year.

Road Builders Recommend on Surplus

CONSTRUCTIVE recommendations on the methods of disposing of surplus construction equipment were made to the Surplus Property Board recently by the American Road Builders' Association, represented by a delegation composed of James J. Skelly, president, representing the Contractors' Division, Paul B. Cochran, president, Manufacturers' Division, H. O. Penn, president, Distributors Division and Charles M. Upham, engineer-director. The Associated Equipment Distributors were represented as acting with the distributors. The road builders' proposals are the first of their kind to be made to the board.

Mr. Upham, delegation spokesman, said, "It is our hope that the policies we have outlined will be given consideration by the board to the end of stabilizing conditions within the construction industry during the transition period and providing maximum employment." He pointed out that disposal of surplus property in an orderly fashion through normal trade channels would go far toward maintaining full employment and conserving a prosperous national economy. The delegation opposed rental of equipment by governmental agencies, and made a plea for protection of small business by inviting bids on small lots segregated by types, trade names and models. It also asked that a Construction Equipment Advisory Committee be selected from the construction industry to advise the board on conditions within the industry.

The proposals were the result of a series of conferences in Washington in which the aims and beliefs of representative manufacturers, distributors and contractors were aired. After the presentation of the recommendations to Chairman Gillette, the committee was asked to make further studies of the construction industry for the information and guidance of the board.

The recommendations, signed by Mr. Upham for the Committee, were as follows:

1. That any and all regulations promulgated pursuant to the Surplus Property Act of 1944 give every protection to the development and encouragement of free private enterprise, to help maintain full employment and conserve a prosperous national economy.

2. That all property be disposed of in an orderly fashion, first, through normal trade channels.

3. That new construction machinery should first be offered to the manufacturers of such equipment for redistribution by them through normal trade channels.

4. That used construction machinery should first be offered through normal trade channels, i.e., persons or firms principally engaged in the sale of new or used construction equipment.

5. That repair parts should be disposed of in the following manner and order, after filling military needs:

(a) That a set of spare parts (machine or emergency kit) go along with each surplus machine sold in this country.

(b) By issuing one year's supply of parts with the issue of each machine disposed of abroad, to be charged against the credit given the foreign agency.

(c) That the Surplus Property Board after disposition in accordance with (a) and (b) above should then offer repair parts to the manufacturer.

(d) That any remaining spare parts should be scrapped.

6. That the government be paid the fair value of all surplus property sold regardless of whether it is disposed of to federal agencies, state, or local agencies, or the general public. In those instances where surplus machinery is not handled by the manufacturer, or through normal trade channels, and is to be offered to the public for sale, all such sales should be on a competitive basis.

7. That the regulations be so drafted as to control specifically the quantities of construction equipment which can be acquired by federal, state, or local government agencies, and that such requirements be restricted to their normal prewar practices and activities and so established as to preclude such political agencies from being given unfair competitive advantage over private enterprise.

8. That the welfare of small business be protected by inviting bids on small lots segregated by types, trade names and models.

9. That all construction machinery outside the Continental United States be disposed of as far as practical in foreign countries for sale abroad for payment of war damage claims, or for

the rehabilitation of war-torn areas. In no case should machinery be returned for civilian use to this country.

10. That all construction machinery having no commercial value or the cost of its care and handling would exceed the estimated proceeds, should be broken up for scrap and disposed of as such and for no other purpose.

11. That there be no rentals of surplus construction equipment by the government or any agency thereof.

12. That there be immediately established under the Surplus Property Board, a Construction Equipment Advisory Committee selected from the construction industry for the purpose of advising the board as to conditions within the industry.

New Highway Legislation Sought in 42 States

Gas. tax increases have been proposed in 15 states; constitutional amendments to prevent diversion appear in 14 states; 45 bills in 28 states would liberalize sizes and weight laws.

—

GASOLINE tax increases have been proposed in 30 bills introduced in 15 states. Seven state legislatures are considering new diesel fuel taxes or increases in existing taxes. Colorado, Idaho and Ohio expressly state that the proposed increases are for raising revenue to match federal-aid funds. In four states temporary emergency taxes on motor fuels have been extended or made permanent. New York, Idaho and South Dakota have the only introductions proposing decreased motor fuel taxes (1 cent increase passed in Idaho).

Anti-diversion constitutional amendments prohibiting diversion of highway user revenue have been introduced in 14 states. However, two of these bills are qualified. Utah 1 would permit highway revenue for flight strips, and Massachusetts H. 1086 specifically exempts motor vehicle excise taxes from its effect. Anti-diversion legislation is under consideration in 7 states. Legislatures of 8 states (16 bills) are considering definite diversions of user revenues.

Interest in increased vehicle size and weight allowances is evidenced by 46 proposals in 28 states to liberalize existing laws. Bills intending extensions of temporary measures to this effect have been offered in 5 legislatures.

Many Bills Relate to Drivers

Much proposed legislation centers around operators' and chauffeurs' licenses . . . 147 bills in 36 states, including 21 bills on drunken driving, on this subject . . . special consideration for servicemen in 23 states . . . Delaware proposes re-examining operators who reach 75 . . . compulsory insurance programs offered in 11 legislatures in 17 bills; Massachusetts proposes gas tax increase to finance . . . Financial responsibility up in 25 states; trend toward relaxation of financial responsibility requirements evident in a few cases.

A recurrent movement for legislation permitting cities and counties to impose taxes on motor fuel is apparent in six introductions in 4 states. New York and Texas have bills to prohibit collection of tolls for parking or driving on state or national highways both within or without municipalities.

Off-Street Parking Coming to Fore

Reciprocity bills introduced in 7 legislatures . . . matter of permitting municipalities to construct, acquire or maintain parking facilities in 6 legislatures; Michigan bill would give counties this authority; several means of financing such projects proposed, bonds and tolls chiefly.

Laws to Meet F.A. Requirements

Supplementing the summary of new legislation which state highway leaders believe will be needed to cooperate with federal post-war program (see ROADS AND STREETS, Jan., 1945), the following additional states have been heard from:

Connecticut: A special highway advisory commission has presented (1) a proposed limited access statute which would let the commission designate routes and acquire r-w with executive approval; (2) proposal to raise gas tax one cent to provide matching funds; (3) constitutional amendment to bar diversion (now part way through legislative path); proposal to increase legal vehicle length from 40 to 45 ft.; (4) broaden the highway commission's authority over traffic lights and controls; and (5) clarify certain existing statutes. From William J. Cox, state highway commissioner, Hartford.

Nevada: No new legislation sought.

Louisiana: No further legislation now.

Maryland: Possible new legislation on roadside control and traffic regulations only.

Georgia: Proposals include legislation to (1) permit land acquisition, amending the eminent domain Act, to speed up and simplify entry upon and beginning work on condemned rights-of-way; (2) clear way for obtaining required rights-of-way; give authority to condemn for a greater width than the present limit of 200 ft.; (3) to designate and construct roads of limited access, restricting adjoining land owner's land use, etc.; (4) authorize long acquisition and creation of facilities for off-street parking; (5) legalize the coordinate system of land location being sponsored by the U. S. Coast and Geodetic Survey and the ASCE through its land survey section. From G. T. McDonald, state highway engineer.

Indiana: Little new legislation. Possibly something on limited access roads and streets, rights of way through cities (now excluded); clarification of laws on state construction through first class cities, where widths now limited. State highway commission chairman Samuel C. Hadden states that the present intention is for the state to do all the federal fund matching for secondary and urban improvements, and hence state road funds must be safeguarded against increased dispersion among localities.

Montana: Legislature expected to issue gasoline tax debentures in its 1945 session, to insure full federal matching.

Highway Matters in Recent Messages to Legislatures

Arizona—Governor's budget message included in $40,000,000 budget, over $5,000,000 for Highway Department for next two years, the first time that agency has been included in a general budget. These figures do not include funds for construction and improvement.

California—Governor Warren reported preparations nearly completed for an $80,000,000 highway improvement program and asked the legislature to re-appraise the entire system in order to plan soundly for the future. He also recommended in budget message that a $40,000,000 highway fund reserve be held for post-war construction of state highways to provide work in localities where need for employment may develop.

Connecticut—Governor Baldwin said Highway Department is planning for approximately $24,000,000 worth of projects that were in part under way when the war began. Said there

(*Continued on page* 81)

One of Erie County's eight rotaries in action last January

How upstate New York battled 100 to 150 inches of snow accumulation during the "blizzardest" winter in memory. Presenting a series of accounts contributed by northeastern state, county, city and airport officials, whose feelings add up to "Praise Allah for modern equipment—if we only had more of it!"

IF Rip Van Winkle had come alive early in February in upstate New York, he would have seen a strange and wonderful sight. Instead of isolation under the deep ten-week-old snow mantle that lay rippled over the countryside, he would have observed farmers going to market almost as usual. Where only occasional sledge teams once would have struggled through the porch high drifts, autos and trucks were streaming along thousands of miles of man-made canyons.

To be sure, winter took its toll in this region. Headlined throughout the nation was the battle to keep rail lines and freight yards open, war goods rolling, commerce from jamming to a standstill. Of the critical shortages of fuel, food and essential supplies which necessitated closing stores, theaters and other places of business. Of the effort of farmers to get milk to market and keep livestock fed. Accentuated by the manpower shortage, the economic losses due to the recent record breaking winter, in this area alone, rose to scores of millions of dollars.

But out of the storm came two opposing facts of significance: In spite of shortages of snow fighting equipment and parts, and of operators and shovelers, the street and highway departments dug out in surprisingly quick time; the old days of winter isolation are gone. But public bodies are still inadequately equipped for extraordinary emergencies.

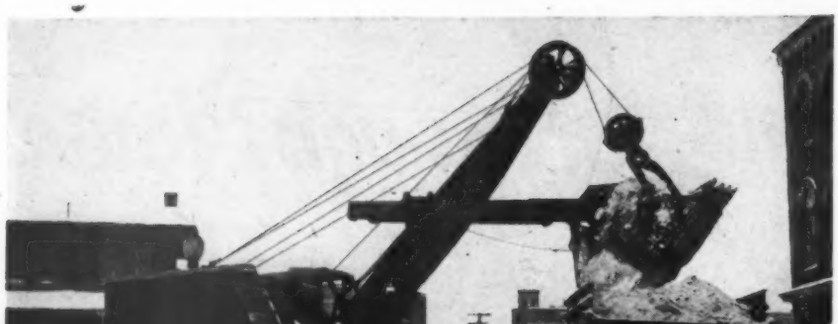
Just how far it is economically feasible to go in increasing snow fleets as war restrictions are removed, is a prime subject for consideration by road and street officials.

How New York Met Emergency

And notes from District Office reports on road conditions and equipment needs

STATE highways were kept well plowed until the late January storms, which quickly led to a serious blockade over 33 counties, or two-thirds of the state. On Feb. 2 the seven counties in the Syracuse district alone reported over a thousand miles of state and county routes closed. Most of the town roads were shut, and three weeks later the plows were still digging out (see table and chart). Railroad lines and yards were overwhelmed and tens of thousands of freight cars were immobilized.

The onset of the emergency brought quick action from Albany, and at the



At Syracuse: a shovel job. Hauling scrapers, loaders and under-body ice blades helped the apron plows

same time focused fresh attention on the need for revising the state's antiquated snow removal laws. Governor Dewey on Jan. 30, spurred more by the rail tie-up than by road conditions, proclaimed a food, fuel and transportation emergency which led among other actions to the following:

(1) The legislature provided an emergency fund of ¼ million dollars and Supt. of Pub. Wks. C. H. Sells was appointed chairman of an emergency committee.

(2) An over-night telephone survey of state-wide road conditions by the superintendent of maintenance, dept. of public works. For the first time in many years an over-all winter-emergency picture of state, county and town road conditions was obtained. Thereafter for two weeks daily summaries of mileages blocked were phoned in from state highway districts.

(3) 24-hour phone service was maintained to handle appeals from isolated citizens, communities or railroads. These were relayed to Albany, telephone transcriptions filed, serious cases of need acted upon with the cooperation of the state troopers and Red Cross and the information thus gained used to spot equipment where most needed.

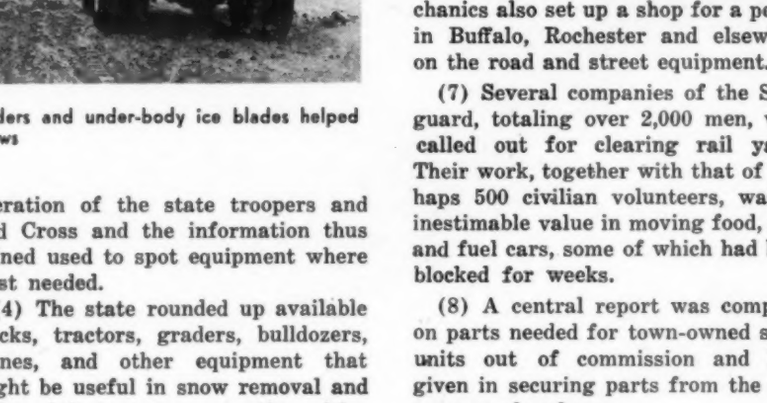
(4) The state rounded up available trucks, tractors, graders, bulldozers, cranes, and other equipment that might be useful in snow removal and assigned it to towns, counties, cities and villages. Most of the state's trucks were too light to stand equipping with wings for bucking drifts, and were withdrawn.

(5) WPB approval was obtained for AA-3 priority release of equipment comprising 8 rotaries to 7 counties, and 22 V-plows and trucks to scattered counties, towns and cities. WPB notified all towns that little more new equipment would be available.

(6) The state department of public works called for volunteers among its district shop mechanics and highway equipment operators to work for railroads on a loan basis. A crew of mechanics also set up a shop for a period in Buffalo, Rochester and elsewhere on the road and street equipment.

(7) Several companies of the State guard, totaling over 2,000 men, were called out for clearing rail yards. Their work, together with that of perhaps 500 civilian volunteers, was of inestimable value in moving food, feed and fuel cars, some of which had been blocked for weeks.

(8) A central report was compiled on parts needed for town-owned snow units out of commission and help given in securing parts from the factory or elsewhere.



How Seven Upstate N. Y. Counties of State Dist. 3 Dug Out of Storm of Jan. 28-31 and Succeeding Period of Cold, Wind, and Additional Snowfall

Class of Roads	Total Mileage in District	Miles Reported Blocked												
		Jan.30	Feb. 1	Feb. 2	Feb. 5	Feb. 6	7th	8th	9th	10th	13th	15th	16th	17th
State	1455	12	193	217	133	71	65	60[2]	59	50	19	6½	6	4⅓
County	2307	194	795	830	677	422	373	320[3]	259	237	168	137	126	118
Town	4564[1]	1129	2495	2495	2269	1527	1519	1141[4]	731	673	525	360	247	162

Counties: Cayuga, Cortland, Onondaga, Oswego, Seneca, Tompkins, Wayne. [1]Includes plow routes only; 900 miles additional town roads are never plowed. [2]44 mi. in Cayuga County, 10 miles Onondaga, 4 miles Seneca, 2 miles Wayne; [3]190 mi. Cayuga, 45 miles Tompkins, 0 in Oswego, 20 mi. each in other three counties. [4]Cayuga town roads hardest hit, with 550 mi. still closed; Oswego in best condition, with only 30 mi. closed.

County Owned Snow Removal Equipment Available During 1944-45 Winter for Plowing State and County Roads in Typical New York Counties

(Not including rented trucks which in many cases did bulk of work)

County	Population, 1940	Mileage Plowed	Total Snowfall to Date, Inches	Heavy Trucks with V's (5-12 ton all-wh.-dr.)	Medium Trucks, V or 1-Way (2½-5 ton)	Light Trucks, Mostly 1-Way (Under 2½-ton)	Motor Graders	Tractors with Plows or Dozer Blades	Rotary Units	Total Units	Additional Units Reported Needed or Desired: Heavy	Medium	Light	Graders	Rotary
Clinton (Plattsburg)	54,000	466	72 (Feb. 1)	5	3	3			1			4–5		2	
Chemung (Elmyra)	74,000	300	57–80 (Feb. 1)	3	5	5	1	1	1		2			1	1
Warren (Warrensburg)	36,000	174+ county	66 (Feb. 15)	4	8	5	2[2]			19[1]	2	2			1
Niagara (Lockport)	160,000	135	110 (Feb. 1)	4	12										1
Essex (Elizabethtown)	34,000	463[3]	55 (Feb. 15)	31[4]	39[4]	•	•	•	•		•	•	•	•	•
Courtland (Cortland)	34,000	369	100 (Feb. 15)	4	12				1		•	•	•	•	•
Genesee (Batavia)	45,000	360	95 (Feb. 15)	3	4	•	•	•				25[5]			several[3]
Albany (Voorheesville)	221,000	•	•	•	•	•	•	2	4[2]	26					
Erie (Buffalo)	800,000	810	115 (Mar. 1)	17	[119 comb.]		•	•	8	•					(No date given)

•Data not given. [1]Attachments owned consisted of 5 V plows with double wings, 5 V's single wing, 4 large push blades, 5 small push blades. [2]One with V plow and wings. [3]Plus 775 miles town rds. plowed with equipment listed. [4]Towns own snow equipment and rent to county. [5]For use also on towns' roads. [6]Tractor-mounted.

New York Needs New Laws, More Equipment

This state activity was for the emergency period only, since New York State ordinarily has no jurisdiction over snow removal from state routes. Legally the towns are the only agencies responsible for roads under old laws still in force, which merely say that "snow removal shall be paid for out of funds available." The state today does sanding on state routes but state and county roads are plowed by the counties in most instances under a clause which allows them to do so with state approval "in the public interest." Under state-county agreement half the cost of snow removal on state roads is paid by the state, not to exceed $75 per mile. This aid was woefully inadequate in many counties.

State routes through cities in New York are plowed by city authorities, but the counties plow state routes through villages wherever stateimproved.

The winter spotlighted the fact that only a few New York counties possess a really modern heavy-duty snow fleet. While no county had enough equipment for this "once in a generation" need, those which depended least on rented equipment and on lending back and forth with towns, fared best. Rented units, especially heavier trucks, were very scarce.

All counties worked below par due to shortage of parts, mechanics and skilled operators, and to the age of their equipment.

The towns, while fairly well equipped for an ordinary winter, were hardest hit and nearly all asked for help. It is roughly estimated that the counties and towns needed at least 50% more snow equipment, or several hundred plow units, than was available. An additional rotary and a few heavy-duty V's in some counties would have shortened the blockade by many days.

District Reports Reveal Useful Data

Following are notes from several state highway district reports dated Feb. 15:

3rd District (Syracuse), Wm. Robinson, dist. engr. State had available 6 blades, 4 V's with wings, 8 graders, 1 truck crane, 2 dozers, plus 2 V's borrowed from another district. If this district with 1455 miles of state roads, had had at the start 20 heavy V's with wings and 8 rotaries to supplement county and town equipment, the costly blockade pictured in the accompanying table and chart could have been avoided in Mr. Robinson's opinion. At least one snow unit for each 20 miles of arterial route plus allowance for 20% layup for repairs, was recommended as needed by plowing agencies for this district.

The city of Syracuse which had 117.2 in. total snow by Feb. 13, used tractor-drawn, earth-moving scrapers to remove and dispose of snow.

4th District (Rochester), E. C. Lawton, dist. engineer. Condition report in this district, before and after the peak of the blockade:

Road Class	——Jan. 30—— Closed	1-way	——Feb. 13—— Closed	1-way
State	22 mi.	84 mi.	18 mi.	143 mi.
County	146	350	283	456
Town	1494	1707	2017	1131

Snowfall at Rochester was 49.5 in. up to Jan. 1, 73 in. to Feb. 1 and 82 in. to Feb. 14. During worsening of conditions Feb. 1 to 4, all work fell behind, town roads were 100% blocked, county roads 80-100%, many with 1-way rutted openings. After Feb. 5 widespread gains were slowed by subsequent freezes. Roads, narrow slots, some can't pass trucks. No turnouts. 34% of mileage still unplowed Feb. 13.

"Most serious obstacle is lack of equipment of sufficient size and right type to handle high icy banks. Over loading has caused serious breakdowns of heavier trucks, and parts are delayed."

Status of snow equipment in this district:

Genessee County—			
34 V plows	6	broken	down
29 blades	4	"	"
Livingston County—			
20 V's	8	"	"
19 light plows	10	"	"
6 graders with plows	1	"	"
4 graders without plows	3	"	"
9 tractor plows	5	"	"
Monroe County			
80 V-plows			
33 light	24	"	"
Ontario County			
56 V plows	16	"	"
12 light	8	"	"
Orleans County			
25 V's	8	"	"
29 light	11	"	"
2 heavy rotaries	0	"	"
1 grader with plow	1	"	"

All equipment 3 to 10 years old. No county has equipment capable of meeting situation. District engineer Lawton believes, based on long observation, that a snow unit is needed for each 10 miles of state road in this district, assuming part of mileage paved wider than 20 ft. At least 50% of units should be heavy all-wheel-drive trucks (225 h.p.) with V's and wings. Each county needs at least

one or two blowers. Towns can cover larger mileage per unit but also need heavier units.

7th District (Watertown), Roy F. Hall, dist. engineer. County snow units on hand. (19% broken down); 170 4-wheel-drives, 136 other trucks, 8 tractors with blades, 17 tractors with plows, 4 power graders with plows and 13 with blades, 6 rotaries. "Worst winter in memory." No thaws all winter, but light, easily blown snow and high prevailing winds; 100 to 160 in. total fall to Feb. 15. Only 20% of roads of all classes blocked—an excellent record, considering.

9th District (Binghamton), Frank W. Donovan, dist. engineer. This southern district was less severely hit. Equipment on hand:

Type Unit	Owned by 6 Counties	Towns Owned
V's on trucks	10	15
One-way plows	1	8
V's on tractors	..	12
V's on graders	..	1
Motor graders	3	9

At least five additional 10-ton trucks, 5 tractors with V's and one rotary were believed to be needed for a similar winter.

Miscellaneous Items from District Reports:

Chautauqua County (Feb. 7). Nine feet of snow. A rotary took an hour to get 500 ft. Two dozers cleared 900 ft. on another road today. 75% of town roads closed. One-way on 25 miles of state roads. Double-header use of heavy plow trucks reported. Other counties envied this county's 2-way radio equipment.

Genessee County. A newspaper report (Feb. 8) said that the secondaries would have to be dug out by hand ahead of the plows, quoting County Supt. Leon E. Phelps as saying that "even the heaviest equipment can't buck the packed drifts alone."

How Erie County Plowed Out

By ARTHUR J. YAW
County Superintendent of Highways,
Erie County, Buffalo, N. Y.

THE Erie County gang had all of their 810 miles of plow routes open again within four days after the storm of Jan. 28-31—most roads in two days.

What made this feat remarkable was the fact that an almost continuous succession of snowfalls with high wind, from Dec. 10 to Jan. 31 had brought a total of 86 inches at Buffalo and over 100 inches in the hill country south. Eight to 12-ft. snow ridges were piled up by plows, which in some instances had made twenty or more passes over a single route up to that date. These canyon walls became consolidated before the plows and rotaries could work the stuff back over the fence lines. The 35-mile wind of Jan. 30 blew a hundred miles of roads shut once again.

By Feb. 1 the county's 125 snow equipment units had operated a total of approximately 27,000 hours for the season. One rotary had worked 23 hours a day continuously for six weeks (without a breakdown)—the equivalent of several normal winters of use. Available men in one of the county's maintenance districts had been out 37 nights out of the previous 51. County equipment burned 97,000 gal. of gas operating an estimated 300,000 miles in December when 35 inches fell, and was used even more in January, when 51 inches fell.

Erie County Has Big Job

Erie County has long considered it a good investment to have excellent snow fighting facilities. And well that this is so, for the county scores just about the nation's No. 1 in winter headaches on the combined factors of population (750,000), county and state road mileage (1,755 miles), average snowfall (73 in.) and winter wind velocity (off Lake Erie; plenty high.)

The 455 miles of state routes take first priority. Many miles are multi-lane. Then come the county roads, of which 355 miles out of the 1200 are plowed.

There are 832 miles of township roads. The township authorities had a bad time of it, being hopelessly short of equipment.

Plowing is organized out of five maintenance district garages, which we hope after the war to reorganize into ten for quicker access to busy arterials nearest Buffalo. Each district is manned by a high-type district maintenance engineer, who works through two general foremen and about ten construction and maintenance foremen. The district engineers are required to be at their desks each day from 9 to 10 A. M. to clear details by phone with the superintendent's office in Buffalo, but beyond this and a few other simple rules he is very much on his own. Each district has four patrol or sub-districts, and during the winter months each has a foreman out all night patrolling the roads, phoning in condition reports and directing the movement of plows and sand trucks.

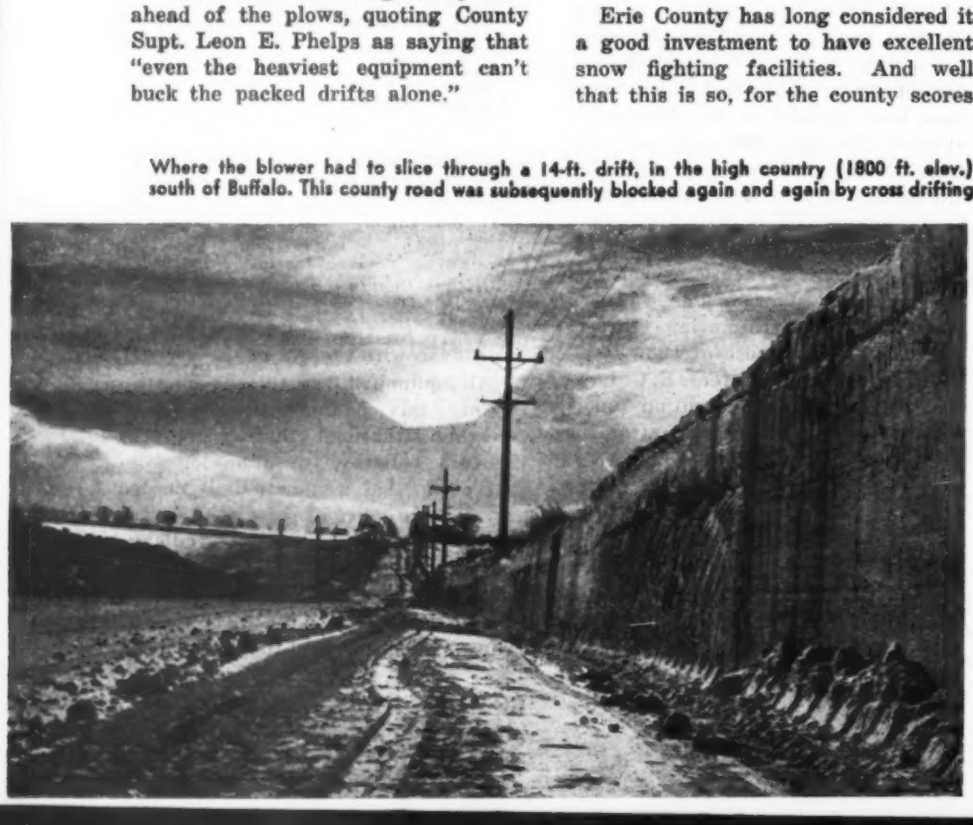
Notes on Plowing Methods

Erie County's equipment can cover its 810 miles of plow routes in two hours on light skimming, but needs four to five days to dig out after a bad blow.

Here this winter, as all over the East, all theories about scientific plowing were blown drift high. "Start plows out," say the textbooks, "when an inch or two of snow has fallen, and do all you can with light trucks and blade plows (front or under-body)." "Swell idea," we agree, "and our men ordinarily follow next with four-wheel-drives equipped with heavy-duty V's and power wings, pushing back and winging down the ridges in readiness for the next storm. Then our rotaries can come through on the worst stretches.

But this winter, by mid-January, we got so far behind on widening that banks have consolidated to where they can't be moved until spring. However,

Where the blower had to slice through a 14-ft. drift, in the high country (1800 ft. elev.) south of Buffalo. This county road was subsequently blocked again and again by cross drifting



(Left): Even after repeated heavy storms half of Erie County's total snow removal job was accomplished with light V's and push blades. Winging back an arterial through a village. (Right): Most of the county's 200 miles of fence was out of sight and of little help

by doing the best we could between storms we were able to clear our 2-lane state roads 30 if not 40 ft. wide, and 4-lane roads correspondingly. Most county roads were kept channeled through but by early February due to the repeated snowfall, drifting and packing, the cleared widths had narrowed sometimes to 25 or 30 ft. and sections of road got away from us entirely for a few days.

Where cuts could be widened, plowing was hampered by the soft unfrozen ground under the heavy blanket.

Old Problem of Ice Crust

Main highways near Buffalo carried so much traffic that a 2 or 3-in. crust of snow became packed on many miles of pavements before the plows could get over the full distance. When such a crust thaws, it breaks up raggedly leaving a rough, dangerous condition. A special point was made to get after this condition after each storm. Although the county uses about 1000 tons a year of de-icing chemicals, no chemicals are used for this purpose but underbody scrapers with scarifier teeth are depended on.

War plant traffic was naturally the first concern, and our staff is proud of several enthusiastic letters of commendation from plant executives for opening drifted roads in "impossibly" quick time.

There is nothing particularly out of the way to note in the county's sanding practice. Stockpiles are treated with proportioned amounts of sodium or calcium chloride in the fall. Plenty of hand spreading was needed to supplement the mechanical spreaders.

Erie County's Fleet

Perhaps the nation's largest county snow fleet, Erie County's outfit, represents an original purchase cost of $1,004,800. The equipment list last winter included 144 snow clearing units, comprising 8 rotaries and 17 heavy-duty V's (all-wheel-drive); and 119 dump trucks equipped with one-way V's, blades or scarifiers. The light and medium plows normally handle 50%, the heavy V's 40% and the rotaries 10% of the snow, as a rough estimate. This winter rotaries carried a bigger share. About 90% of the trucks are 6 years old or older, and some of the plows have seen 15 to 17 winters. Most of the older V plows are lighter and lower than standards call for today. In addition to rebuilding the frames and attachments, year by year, the shop crews have built up apron heights for faster plowing, added or rebuilt power wings, and progressively converted all but a few of the oldest plows to hydraulic power control.

Began in 1924

It is interesting to recall the county's first plows, which were 10-ton-tractor-mounted, wooden affairs "like plowing with the corner of a barn." Snow removal work started in 1924, with the purchase of two or three tractors. Motorists put their cars up for the winter. In 1927 ten wooden plows were added. Up until 1930, trucks still had hard rubber tires and storms meant a general blockade.

Then real modern equipment came on the market. The county bought its first 30 miles of snow fence in 1930 (now has 198 miles), voted $250,000 for snow removal equipment, and set up the present 5-district, intensive plan of operation to keep pace with public demand.

Spurred in January by the emergency the county ordered 5 new rotaries, 2 heavy-duty V outfits and 5 additional ice cutting blades, representing $150,000. Next on its "want" list is 2-way radio equipment. It was badly needed, and the cost and merits are being investigated.

As high as $400,000 has been spent in one winter to clear snow, and the past winter's bill may top this ($500,000 est.)

Snow equipment is worked on an hourly rental basis. Typical hourly rates, which remain fixed throughout the life of the units (except for 15% general increase in 1942) and are based on 9½-hour day, are as follows:

A nicely cleared pavement, but note the powdery snow sweeping across

Equipment Unit	Hourly Rate
Snogo on FWD truck (largest model)	$9.00
Walter truck with V-plow, power wings	3.00
Walter truck, summer maintenance	2.60
7½-ton Marmon-Herrington all-wheel-drive truck, with blower	5.00
6-ton White truck	$2.70 and 2.30
5-ton GMC truck, with plow equipment	$2.15 and 2.65
3½-ton Autocar, with plow	2.15
2-ton truck with plow	1.50
Ford ½-ton pickups, for sanding, etc. (per day)	2.00
Power grader	2.50

Erie County's five districts worked 50 regular and 30 extra operators and laborers each during the emergency. We pay good wages, and work hard to build up our crew in summer on general maintenance. Our men have kept with us quite well during the war. It takes two or three years for an *equipment operator* (we don't call them 'truck drivers') to learn to run a heavy plow properly. Many of our fellows are 20 or 25-year men. Almost any of the county's foremen, gradermen or shovel runners can jump on a snow plow and operate it. The draft board has cooperated with us by deferring some of our good men and because we feel that snow clearing is vital, we unhesitatingly have adopted the policy of not taking a man back once he has resigned to go to a factory job. We do this to show

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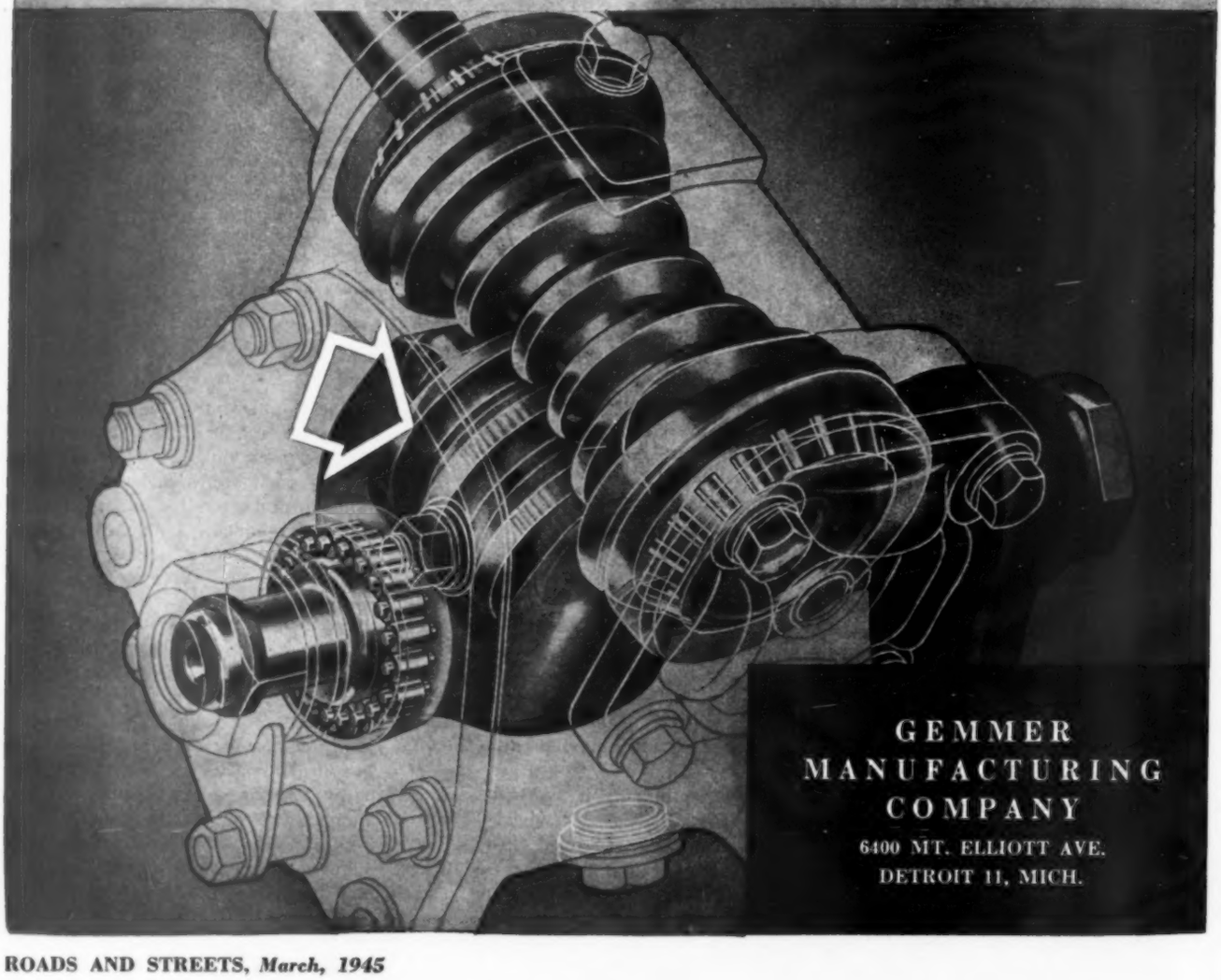

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Erie County superintendent of highways Arthur J. Yaw (front center) with his "snow executives" which include Wm. Borrmann, in charge of maintenance, and district maintenance engineers Walter N. Benson, Edmond D. Walters, Lawrence Freeman, Wm. Allan and Ray Fiegel

those who stay that their loyalty is appreciated.

We are hiring a few ex-service men right along, and will take all the good ones we can get.

Erie county's operators have an exceptional pride in the way they run and care for the machines assigned to them. Our method places only limited value on paper instructions, but depends more on bringing the men in and showing them, over and over. Foremen hold monthly meetings with operators to keep this feeling alive. Even in snow storms and other emergencies, when several relief operators will take a machine, each machine is still the responsibility of the man to whom it is permanently assigned. So the men learn to cooperate with each other as their equipment is shuffled in and out of the repair shop.

Miscellaneous Notes

Prevailing west winds are the big problem, and the county plans to use tree plantings more and more to reduce drifting. Snow fence helps ordinarily but was buried last winter, since workers could not be spared to reset above the snow. Some 4x8-ft. sectional board fence, erected at 15 degrees slant from the vertical, has been used along with the more common wire-and-slat fencing and is well regarded.

Each year the county maintenance forces have widened a few cuts on shoulders on one or both sides, deepened or widened ditches and taken other steps to improve road design to minimize drifting and snow clearance, but only a start has been made in this direction.

Buffalo's Problem: Equipment

By NEWALL L. NUSSBAUMER
Commissioner of Public Works,
City of Buffalo, N. Y.

THE city of Buffalo, "snow capital" among our metropolitan cities averaging 73 inches over the years, was caught this winter with a mere handful of city-owned equipment and an acute scarcity of rental units. Normally it has depended a great deal on contracting with truck and dozer owners, and at the beginning of winter possessed only fifteen usable plow trucks, a number of blades, etc., plus a telephone list of 75 contractors. About half the contractors, however, had tied up with war manufacturing plants under inducement of a standby rate.

And what a winter! The Dec.-Jan. fall of 89.6 in. was eighteen times that of the previous winter and a new record for the period. From Dec. 10 to Jan. 4 alone, 67.3 in. fell.

When the first storm hit Buffalo Dec. 10, city forces were able only with the greatest difficulty to get 60 snow units of all kinds out on a street system of 710 miles.

Hindered also by breakdowns, lack of shovelers and mechanics, and by the repeated snowfalls and continued high wind and cold, the city forces fought a good fight. Although arterials were opened in a matter of hours after each fall, drifts blocked some side streets for days and weeks, huge banks along gutters throttled traffic flow, hampered retail business, demoralized truck transportation and cost the city millions of dollars in economic loss and its citizens millions of hours of delay.

Several factors worked to make the recent storm a difficult one.

The city has received a constantly diminishing aid from the street railway in plowing track zones. Under an old agreement this company is required to remove all snow from tracks and a strip 2 ft. beyond. The car lines once owned 45 street car plows and 45 broom attachments. This aid is now down to 4 plows and 6 brooms, which cover only 42 miles, reflecting progressive abandonment of rail lines for bus routes. About 72 miles of lines were withdrawn in the past two years.

Thus the city's snow clearing job has increased faster than the normal rate chargeable to general city growth and rising standards of service, and has done so at a time when the city airport and huge acreages of paved parking areas around industrial plants have appeared, swelling the total snow clearing job to be done by available equipment in this area. In short, Buffalo's problem possesses many aspects typical of all large

Loaders and more loaders were needed by most northeastern cities. Here is a modern unit, one of a fleet (owned or rented) which helped clear downtown Boston from the near-record 13 in. snowfall of Feb. 9, 1945

Bulldozers saved the day in Buffalo's downtown area, on which 2,000,000 tons of snow fell this winter

northern cities in wartime, and spotlighting its problem while a record winter is still fresh in mind should be helpful to city officials in planning the far more highly mechanized service the future is sure to bring.

Operating Plan and Equipment

The city department of public works covers all street areas except the car track zone, and 20 miles of parkway boulevards handled by the parks department. The division of street cleaning, which handles snow, is divided into 15 districts, each with an office and foreman in charge who work days. An assistant foreman works midnight to 8 A. M. normally. In winter emergencies the two go on a 12-hour basis for round-the-clock service.

Prior to the war the city had a smooth-working plan of plowing and sanding operations. It was organized on the "fan and hub" plan, since arterial streets fan out of downtown Buffalo in all directions. The pre-war system was to get plows out in the night and at 4:30 A. M. begin plowing and sanding arterials toward town, working with traffic and finishing if possible by 6:30 when the morning in-bound rush is on. From 6:30 until 9 A. M. plows worked outlying cross streets, then went back and cleaned up arterials.

Today traffic patterns have been completely upset by 24-hour operation of big new war plants. Shift changes send traffic in both directions three times a day at all hours. War workers, too, block downtown later at night and snow work in the business section must be concentrated between 2:30 and 6 A. M. The present scheme is to keep an excess of equipment stored at the two snow districts nearest downtown, and call these units out at 2 A. M. when a storm has begun.

This winter, as before, the lakefront arterials because of wind exposure blew shut frequently and rescuing of stalled cars was a heavy chore.

How Buffalo forces marked street-side drifts about to be plowed

Short of Equipment, Men

The city-wide street equipment list as of Dec. 1 included four flushers, which operate in winter with plows; 8 sweepers, 6 loaders, 1 power grader, 3 dozers (needed on the dump) and 30 trucks. About 42 operators are employed permanently. In addition there are 75 refuse collectors and other workers and 66 men (mostly overage) who do patrol work, sweep sidewalks downtown, etc., but who aren't assignable to heavy snow labor. Thus the available snow fighting staff was 70 workers, operators and 30 supervisors, or 142 in all. Normally in past winters this crew has been supplemented by 1,000 to 2,000 temporary shovelers. In a 1942 storm, reflecting the beginning of the manpower shortage, only 800 could be hired. Only 60 could be found for the Jan. 28-31, 1945, storm.

After this storm, biggest and worst timed, downtown intersections remained flanked with snow ridges for a brief period and truck removal from such areas was reduced to a trickle. The city lost considerable parking meter revenue as a result. But during December and January, 4,000 eight-yard truck loads were moved from downtown, using hand shovelers and working ahead of the snow loaders with angle-dozers to loosen the crust.

Each inch of snow on the mile-long business area represent an estimated 23,900 cu. yd. of snow.

As to the rental picture, only 10 graders and 15 dozers proved available. These slow-moving units were put at intersections and downtown, shoving back and cutting ice ridges and working around parked cars. About 30 or so plow trucks at first obtainable were dispersed under rigid supervision to needed points.

Cause of It All

Buffalo weather data

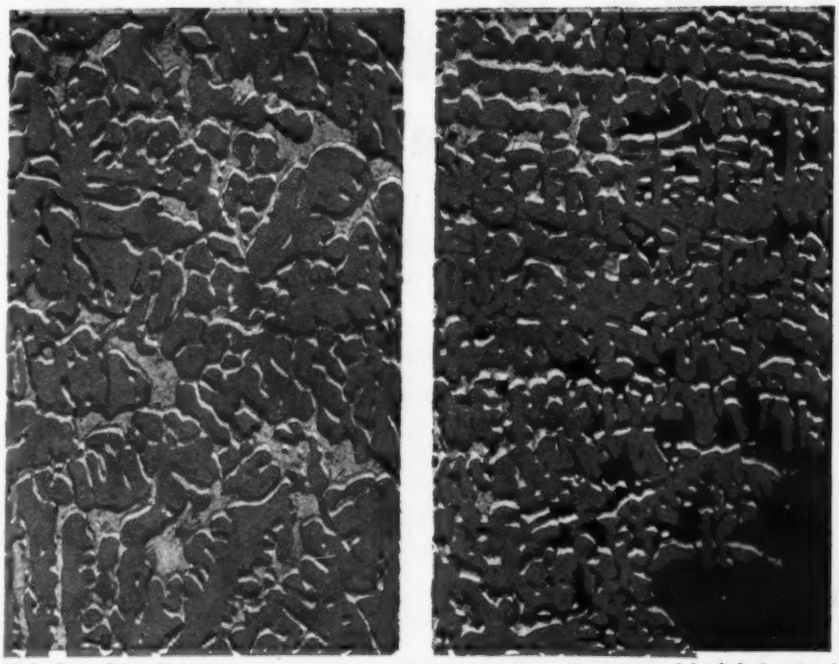
During December

- Snow fell on 23 different days
- 9.4 in. fell Dec. 12
- 6.0 in. fell Dec. 25, followed by 5.4 in. more Dec. 27
- 35.1 in. total fall or over twice normal
- From Dec. 10, only occasional slight daytime thaw; foot of snow on ground Dec. 31
- 25 m.p.h. or higher wind on 13 days

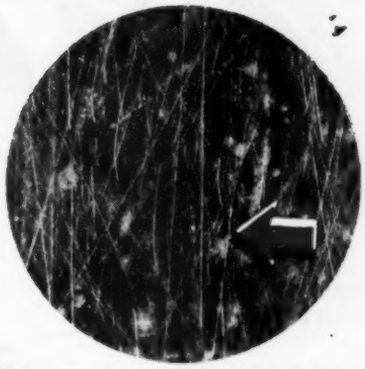
During January

- Snow on 28 different days
- 11.6 in. fell Jan. 2 (with 41 m.p.h. wind), followed by 5.7 and 4.4 next two days and more wind
- 8.8 in. fell last four days of month
- 50.6 in. total fall, or 2½ times normal
- Only two slight daytime thaw periods (under 40°)
- 27.4 in. depth on ground Jan. 31
- 25 m.p.h. wind or higher on 14 days with 26-37 m.p.h. cold wind during 4-day month-end storm

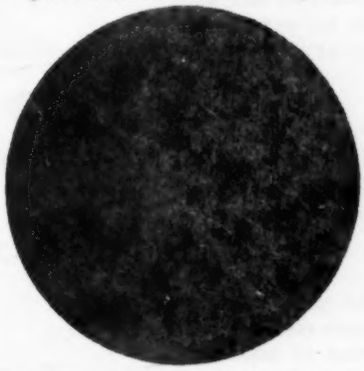
How RPM DELO Eliminates Diesel Bearing Corrosion



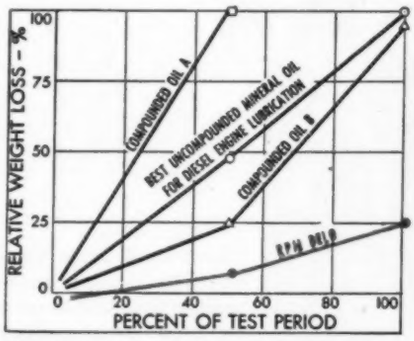
This is what happens to a copper-lead bearing when unstable lubricating oils that become corrosive, attack the lead. The picture on left shows a greatly enlarged cross-section of a new bearing, the copper in red, and lead in light grey. The picture on right shows the same type of bearing with the lead (light grey) eaten away from the surface by corrosion, leaving a copper honeycomb which disintegrates under pressure. RPM DELO Diesel Engine Lubricating Oil eliminates such corrosion of copper-lead or any kind of bearing.



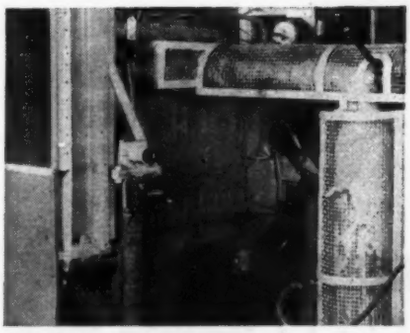
This is a greatly enlarged photograph of a cadmium-silver bearing when new. The arrow points to slight scratches from the broaching tool.



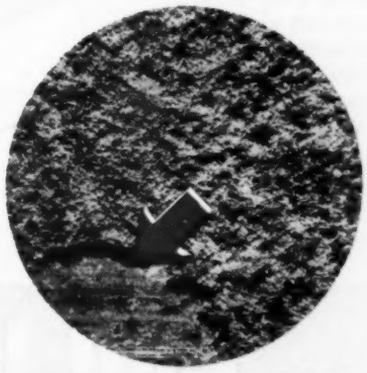
The same type of bearing is shown here, after use with RPM DELO. The bearing surface is in excellent condition.



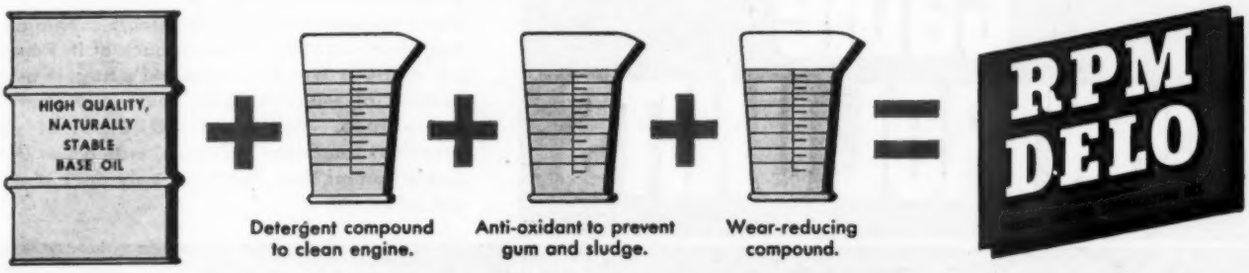
This chart shows what happens when copper-lead bearing strips are placed in oil which is subjected to oxidizing conditions at a temperature of 280° F. Note the extremely low weight loss with RPM DELO by comparison with other oils, compounded or uncompounded.



This photo shows equipment used in a 500-hour test on RPM DELO by Standard's research organization—RPM DELO has met every laboratory and field test. For specific technical information, write, asking for booklet T-2, Standard of California, San Francisco 20, Calif.



This bearing was used with an unstable lubricating oil that became corrosive in service. Note that the entire surface is pocked and that actual breakdown is occurring on the surface. This can be eliminated by the use of RPM DELO.



Detergent compound to clean engine. Anti-oxidant to prevent gum and sludge. Wear-reducing compound.

STANDARD OF CALIFORNIA

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, Imperial RPM DELO CONCENTRATE

More Loads per Day!

MORE OPERATING DAYS PER MONTH!

Servo-type self energizing brakes.

Outside clutches and brakes for accessibility. Self-ventilated for cooler operation.

Cable load is taken directly from drum to housing thru tapered roller bearings.

All gears are spur-type requiring minimum of adjustment.

Sturdy steel housing prevents excessive distortion of parts. Provides lubrication chamber for entire unit.

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GAR WOOD Cable CONTROL UNITS

Gar Wood Cable Control Units are engineered and constructed to give unsurpassed performance, under the toughest conditions, with a minimum of "down time" for adjustments. Special emphasis is placed on sturdiness to avoid excessive distortion of case and parts. Every minute detail of this smooth-running unit has plenty of trial and proof back of it. Remember that Gar Wood is the world's largest manufacturer of winches, with years and years of experience. You'll get MORE out of your machines (regardless of make) with a Gar Wood Cable Control Unit. That's not only our claim . . . ask any user.

AC

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ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

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OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Breakdowns of city and rental units for a while ranged from 12 to 28 daily out of 50 units on hand. By Jan. 30 only 37 rental units were at work, and the combined usable fleet then consisted of only 43 plows, 7 dozers, 3 graders and 2 loaders.

Late in December on a plea from the city, the state department of public works furnished 18 plows and 72 men for a period, including a full crew of mechanics set up in local garages. This aid, which was of tremendous benefit, was withdrawn about Jan. 10 to help other cities, and when the late January storm hit, the state's equipment was committed elsewhere.

The city also was helped by the State Office of Civilian Protection, which arranged with the National Guard for trucks to pull stalled cars. A sound truck moved through certain streets asking people to move parked cars ahead of the plows.

Syracuse, N. Y., was another city which pressed all available dozers into service

The parked car problem was further aided by an emergency ordinance which banned all-night parking or all parking from one side of 33 designated streets.

One of the chief problems was to uncover the city's 17,500 sewer inlets most of which lay buried. The locations of 6,000 were marked by red flags and citizens urged to dig out the receivers along their property. Paving, plumbing and utility companies sent out crews to aid.

New Equipment Ordered and More Contemplated

On Feb. 1, spurred by the emergency, the Buffalo Common Council committed itself to a $237,500 bond issue to buy new snow equipment as priorities become available. Five new plows and one loader were expected immediately. It also voted an additional $187,500 for current snow removal, having previously appropriated $653,000. Total cost to Jan. 31 was $353,000, which included $183,000 for hired equipment (which had worked 47,000 hours) $10,700 repairs and material, $2,800 grit, $9,600 so-

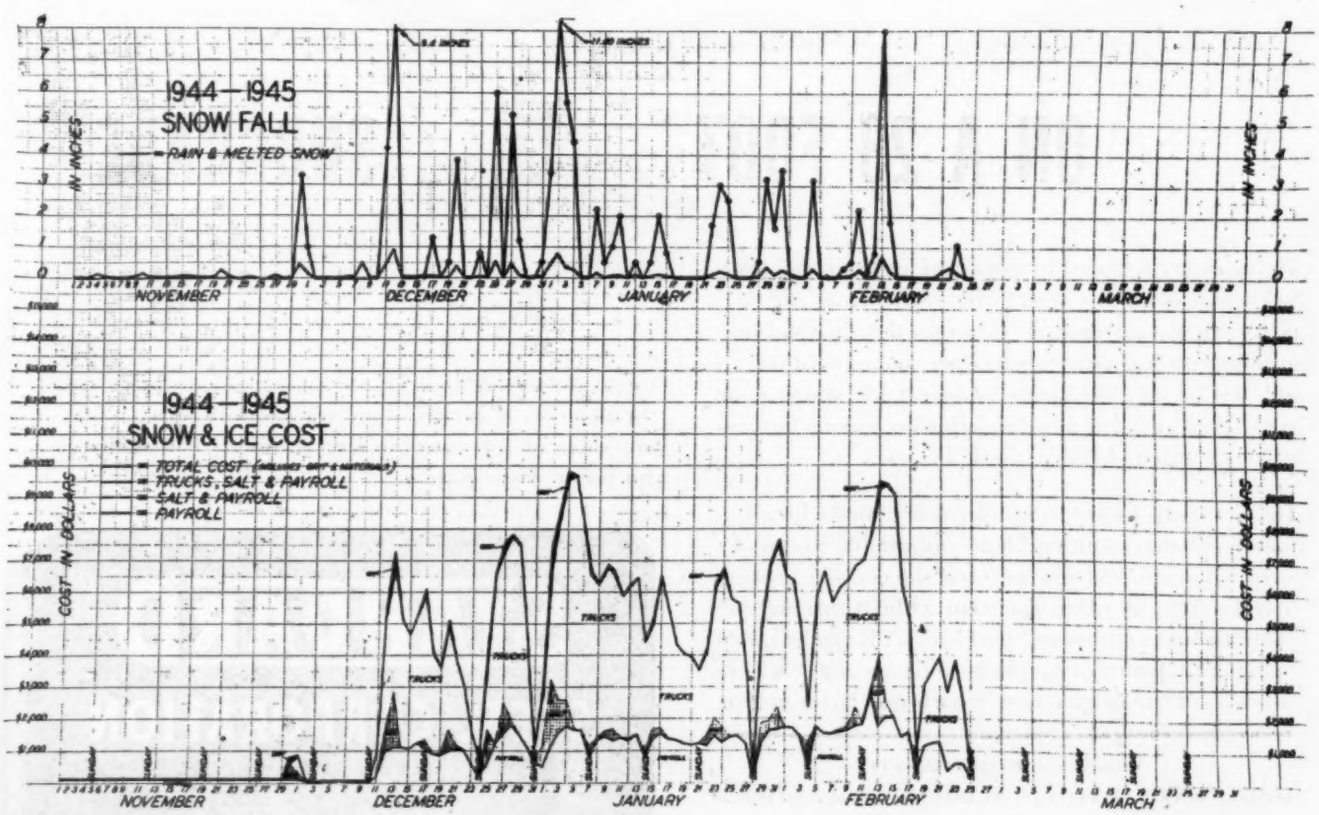

Chart of snowfall and snow and ice costs, city of Buffalo for past winter. Note that there was an almost continuous fall of snow from Dec. 1 to Feb. 15. Not revealed by this chart was the further complicating fact that the temperature almost never went above freezing throughout this period. Hence, the 115 in. total snowfall all stayed on the ground, packing to 3 ft. depth and drifting continuously.

3/4¢ PER SQ. YARD

ON A 23 FOOT SUBGRADE

The economy achieved by the use of a STANDARD-LEWIS Subgrader is quickly seen in the report from one contractor (name on request). He writes that the total subgrading cost was only ¾ cents per square yard on a 6 mile paving job. The same economical operation can be yours. And added to this, the following unique features make this subgrader a "natural" for you.

The STANDARD-LEWIS Subgrader is designed with a sectional stationary cutting blade (adjustable to any desired subgrade contour) on each side so that grading may be done in either direction without turning machine, or time consuming "pull backs." It can be raised by power to pass over manholes, culverts and other obstructions while in operation. Wheels may be turned 90° to permit towing by truck or tractor over bridges or through narrow places. Many other features make it the one subgrader designed to meet post-war requirements for better, faster paving.

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CONCRETE FINISHERS • LOADERS • ROLLERS • POWER BROOMS

STANDARD STEEL CORPORATION

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Equipment Owned in Typical New York Counties by Counties and Towns Combined
(Towns do all or a part of arterial road plowing)

County	Snow to Feb.	Miles of Road (incl. town)	Heavy 4 wh dr	Medium	Light	Rotaries	Tractors	Graders
Madison (Wampsville)	118 in. (2/12)	581 mi. town	27	(12 to 14 all sizes)		4	2	—
Wayne (Lyons)	110 (2/1)	1252	(65 vehicles with plow equipment)				several	12
Ontario (Canandaigua)	72 in. (2/15)	1278	67 plow units of all sizes					
Delaware (Delhi)	80-100 (Mar. 1)	—	22	10	35	1	—	—

dium chloride, the rest covering payroll and city-owned equipment. The total winter bill is expected to total a million dollars, representing $1 in city taxes on each 1,000 assessed valuation. Snow removal costs in the recent storm ran as high as $12,000 per day, with a peak of $15,000. The council also granted time-and-a-half for overtime, to attract help.

In presenting data on future equipment needs to the city government, we stated a commonly heard rule that a plow should be available for about every 5 miles of residential streets and one for each 1½ or 2 miles of business streets. On this basis Buffalo should have 182 plows. It was recommended as a post war project that the city ultimately have 90 trucks and plows attachments if the council sees fit to change from the present rental policy, augmented as needed by rented trucks fitted with city-owned plows. These 90 outfits plus 10 new bulldozers, all of which have year-around use, would cost about $900,000, or $113,000 annually on an 8-year basis. Authorities foresee a continued high rental cost for equipment, and the growing need is for a city-owned fleet of the specialized types of units it needs—units which will always be on hand and run by operators trained in their efficient use, as with fire-fighting equipment. An annual direct saving of $100,000 or more would result, in addition to the larger economic benefits of faster removal.

A new and modern centrally located equipment garage is also recommended.

Street maintenance and snow removal in Buffalo are directed by James Hilliary, commissioner of streets.

Heavy Equipment Saved Onondaga County

By RAY B. TRAVER
Superintendent of Highways,
Onondaga County, Syracuse, N. Y.

FOR the past 19 years Onondaga County, N. Y., has been building up its snow removal facilities for just such a test as the recent winter brought. This county owns one of the most modern and complete snow fleets of any county in the U. S., comprising 53 all-wheel-drive trucks of 150 or 200 hp., 46 being equipped with V-type plows and 4 with both V-plows and blower type wings. These units are systematically replaced on an 8-year basis. Ordinarily the county hasn't depended a great deal on rotaries but on prompt plow work, but in January it yelled "help" and got quick approval and delivery on a new blower to augment three older units.

Following good "engineering" principles, the county has tried to develop a staff, organization and fleet able to keep all roads cleared during ordinary snow storms and clear all plow routes within a few hours after

(*Continued on page 77*)

6 features

EXCLUSIVE WITH THE Snow King

2
ACTION

Forward-pitched blades take snow with shovel-action and eject it through chutes by centrifugal force.

1
SPEED

Combination of Vee point and powerful rotors makes increased forward speed and penetration possible.

Model 883 is illustrated

There are other models driving off the power-take-off of a crawler type tractor, and also side widening and loading models especially suitable to city street snow removal and on landing fields. Models are available to attach conveniently to any four wheel drive truck of five ton or over capacity.

3
CONTROL
High chutes, power hydraulically operated from cab, control direction of snow stream as desired.
4
BALANCE
Rotor and wedge action of Vee counteracted by truck push eliminates side draft, resulting in easy steering.
5
POWER
A mighty engine, independent of truck engine, drives rotors. Enclosed cabin provides emergency quarters.
6
PROTECTION
Side runner and bumper protects cabin and acts as guide in deep snow drifts.

If you have snow problems, write today for descriptive literature and information. Snow King is the "king" of all plows . . . be sure to investigate when you are in the market.

THE ROTARY SNOW PLOW COMPANY

Builders Since 1922

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On The Public Highway - - -

- - - Or The Private Haul Road

IT'S ALL THE SAME TO MISSISSIPPI WAGONS

MISSISSIPPI WAGONS are the only bottom dump hauling units powered by a heavy industrial tractor that can haul payloads of more than 26,000 pounds over most state and federal highways without exceeding the laws on axle loadings and maximum widths.

This is made possible by the weight transferring feature which is exclusive on MISSISSIPPI WAGONS and provides a four-axle unit, instead of a three-axle semitrailer.

A single investment in MISSISSIPPI WAGONS provides the contractor with both his construction and long haul equipment.

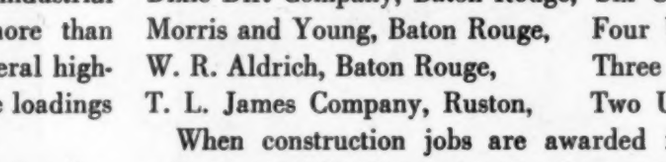
Here are some of the contractors in the State of Louisiana who are now using MISSISSIPPI WAGONS for long haul work over state highways:

C. B. Stuart Company, Baton Rouge, Six Units
Dixie Dirt Company, Baton Rouge, Six Units
Morris and Young, Baton Rouge, Four Units
W. R. Aldrich, Baton Rouge, Three Units
T. L. James Company, Ruston, Two Units

When construction jobs are awarded in the postwar period, these and other owners of MISSISSIPPI WAGONS will have the "World's Most Modern Hauling Units" available to meet competitive bids—and still make profits. Because their single investment in MISSISSIPPI WAGONS provides them with all 'round hauling units suitable for varied types of jobs. Write us, or contact your nearest International Industrial Power Distributor, for full information on MISSISSIPPI WAGONS.

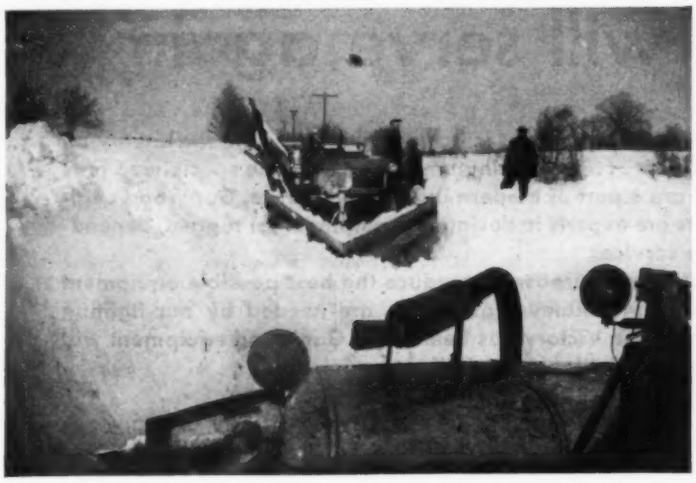
"THE WORLD'S MOST MODERN HAULING UNIT."

MRS



MANUFACTURING CO.
JACKSON, MISSISSIPPI

One of Onondaga County's four roto-wing units, following through to shelf off the drifts shown in the two adjoining scenes



(Left): Plows working toward each other, south of Syracuse. The third day after the big "last straw" storm of Jan. 30. One truck ahead is helping other out of difficulty caused by operator's failure to work cut wide enough. (Right): "Roads and Streets" Editor, Harold J. McKeever, with County Superintendent Ray Traver, back of a 150-hp. truck which had rammed through several hundred feet of 6 to 12-ft. drifts in an hour's time

(*Continued from page* 73)

heavier or quickly repeated storms.

This county's snow fighters, in short, never knew what it was to be "snowed under"—until this winter, where 120 in. had fallen at Syracuse by Feb. 7, and while outside of the city depths ran from 140 in to 160 in. (Normal annual fall for Syracuse is 95 in.). From Nov. 30 to Feb. 1 there was not a single heavy thaw or interval between storms long enough to permit widening out the plowed highways. It simply would not have been economically feasible to be equipped to keep all roads clear at all times, if indeed this had been physically possible. During and following the numerous storms only the emergency system of plowing, as herein described, could be followed.

This county plows 665 miles under four district foremen. Normally, to clear this mileage promptly the 42 plow routes set up are sufficient. In fact during a light snow the whole job is done in 60 to 90 minutes from the time the equipment leaves the shops.

Emergency Routing Became Normal

In the early part of winter (again referring to normal conditions), routes are combined so as to cover this routing with half the number of truck units. As the season progresses, additional units are made ready so that shortly after the 1st of January, all of the 42 routes are generally covered by individual units. This regular routing is carried on throughout the balance of the season, except in emergencies, when certain routes are abandoned and the truck units are combined on the principal highways or the through-roads and the connecting links between villages (emergency routing previously referred to).

During emergencies, as each plow leaves headquarters, the driver is given a transparent envelope containing a card on which is described his route or course. On the back of the card is the emergency routing to be followed, when notified. Trucks are shifted from the more quiet areas to the section encountering the most difficulty, in addition to the emergency routing.

The plow operators, drivers, mechanics and helpers are monthly employees and work the year around. As monthly men, they are not paid for any overtime. An agreement was reached a few years ago, in which the county each year gives the men Saturdays off from May 1 to Nov. 15 and they, in turn, work Sundays and holidays and overtime, when needed, without extra compensation. Every employee is subject to call 24 hours per day and works such hours as are required in addition to the 8-hour day. The employe is protected by Civil Service and has vacation and sick leave benefits. He also becomes a member of the retirement system. The arrangement is quite satisfactory on both sides, and the county's success in holding onto experienced operators was worth many thousands of dollars to its citizens in the recent emergency.

Onondaga County is also noted for the efficiency with which its equipment is kept serviced and repaired. See the Construction Equipment Maintenance section of this issue.

▼

The county seat of Onondaga County, N. Y., Syracuse (pop. 225,000), is reported as owning 50 modern, heavy-duty, all-wheel-drive snow trucks.

▼

New York City's snow removal costs have reached as much as $25 per inch of fall per mile of road; $2,262,000 spent to Jan. 30 with 18-in. snowfall. At peak times it has used 48,000 men, 3,200 trucks and 1,400 plows in a single storm. New York flushes snow into sewers through specially constructed curb inlets when temperature is above freezing.

WHEN THE INDUSTRIAL GIANT RETURNS TO CIVILIAN PRODUCTION

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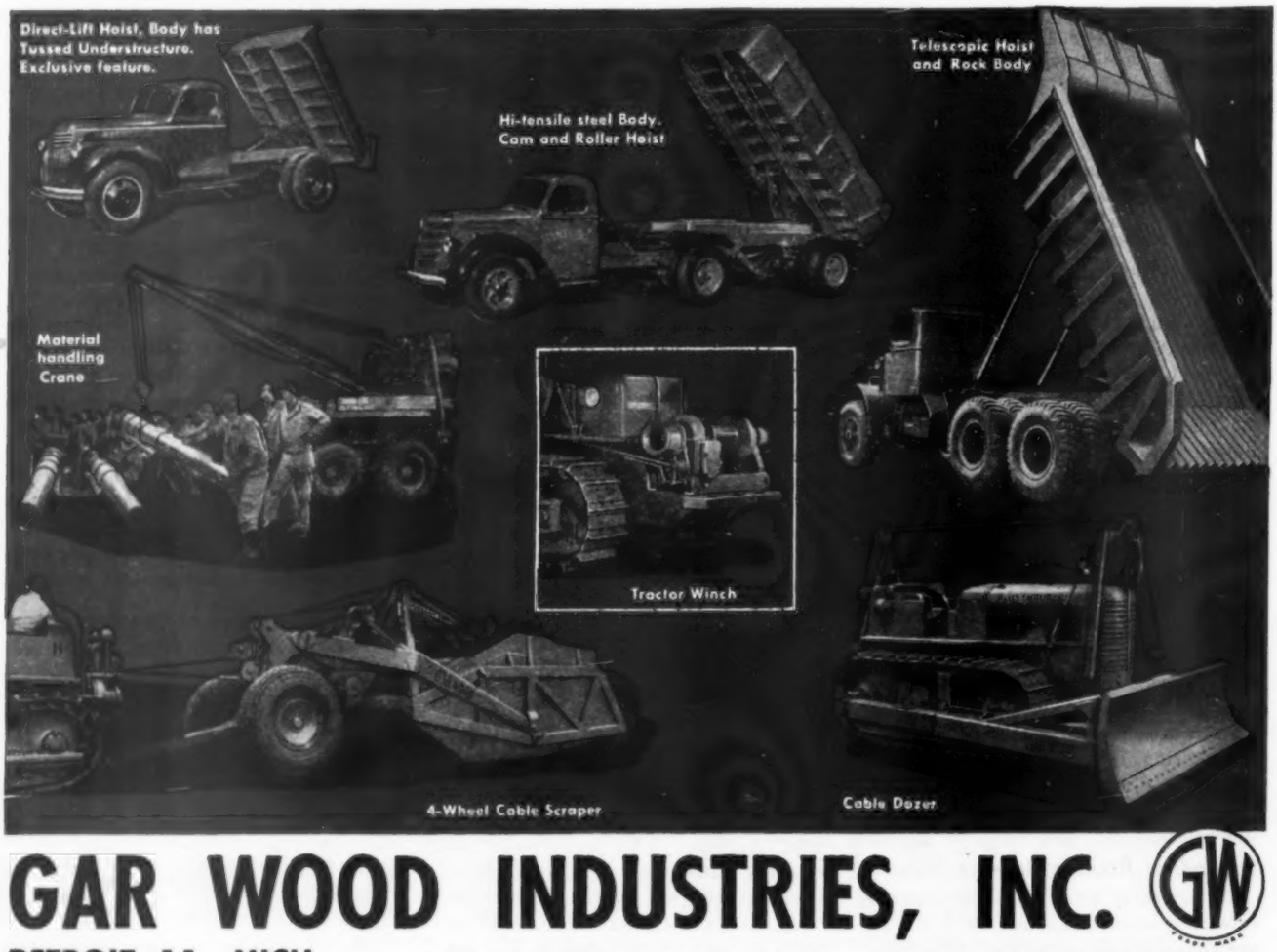
Specialized Equipment
will serve again

Gar Wood equipment is "slugging it out" with the enemy on all fronts . . . performing a hundred and one specialized jobs that are a part of modern industrial warfare. Gar Wood engineers are experts in designing equipment for rugged, dependable service.

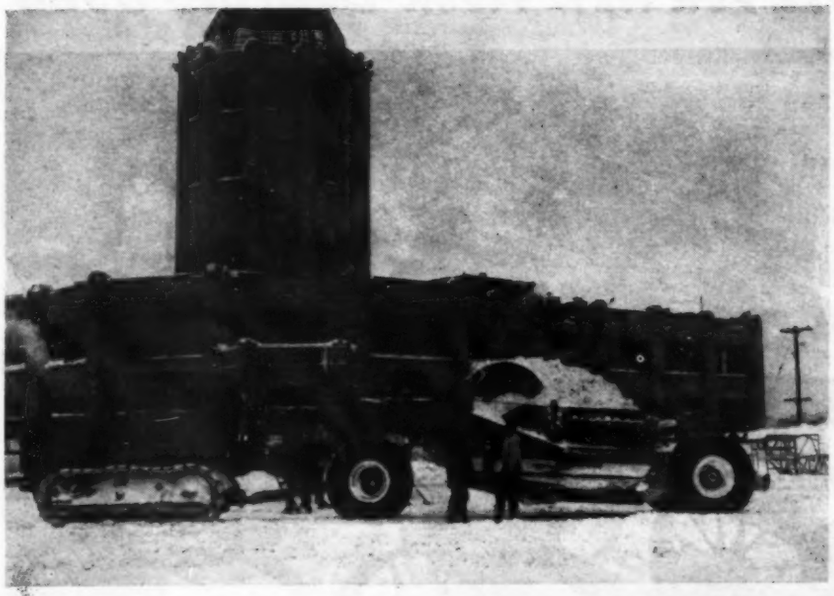
It is our purpose to produce the best possible equipment of war in whatever quantities are needed by our fighting men. When Victory has been won, Gar Wood equipment will again be available for civilian use.

BUY U. S. WAR BONDS TO ASSURE EARLY VICTORY


Direct-Lift Hoist, Body has Tussed Understructure. Exclusive feature.
Hi-tensile steel Body. Cam and Roller Hoist
Telescopic Hoist and Rock Body
Material handling Crane
Tractor Winch
4-Wheel Cable Scraper
Cable Dozer

GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICH. HOISTS AND BODIES, WINCHES AND CRANES, TANKS, ROAD MACHINERY, HEATING EQUIPMENT, MOTOR BOATS



Tractor-scraper units were used at Buffalo airport to clear runway intersections, also helping on ramp and hangar areas. Runways here are cleared by making initial cut with an angledozer, following with blade plows that windrow the snow, then using rotaries

Buffalo Airport Winter Maintenance

By N. E. DUFFY
Director of Airports, City of Buffalo, N. Y.

OUR methods of moving snow at the Buffalo Airport are as follows:

When plowing runways, we have an angledozer make the first cut, then follow by heavy-duty, straight-blade plows that windrow the snow, following this procedure by the two rotaries blowing the snow with the wind, and scattering it over a large area.

On reaching the other edge of the runway, the angledozer makes what we call an "inside cut"; that is, it throws the snow away from the edge of the runway so that it will be windrowed for the rotaries and blown away, leaving no banks. At runway intersections, where you are always bound to have a pile of snow, we go in and take this out with tractor-draw earth-moving scraper "pans." We clear two to three hundred yards away from the runways or intersections and take it out into a field where it is graded out evenly by the scrapers. This gives us an even surface and no piles. Of course, a lot depends on the operator on this piece of equipment.

I have also discovered that the rotary plow is excellent for moving water off runways when sudden thaws occur. Water doesn't run away fast enough at such times on account of snow on the drains, but collects on the runways to a depth of three or four inches. We have used rotaries to literally blow this water off the runways and the method has been successful.

To give good braking action for all types of aircraft we haul in hot grit and spread by a gasoline spreader attached to the back of a truck. This has been very successful here in Buffalo. Even with the severe winter, at no time have we had bad braking conditions for aircraft.

The important thing is to prevent banks along side of runways and this can be eliminated if the snow is windrowed properly and, as mentioned, this inside cut is made and then blown by the rotary.

Ramp and hangar areas are cleaned with a combination of plows and scrapers; for instance, the plows windrow the snow and scrapers carry it off the field to an area used for dumping away from any flying area.

Snow fencing is also excellent where it doesn't interfere in any way with the airplane traffic or the emergency landing areas.

We also have a method of locating our lights by putting a black flag at every light before the snow comes in the fall and also we locate our drains in the same manner. To mark the ends of the runways we have planted on either side of the runway, one hundred feet back from the end, two small four to four and one-half foot Austrian pine trees, which are a greenish-black and give an excellent contrast to the snow. This is done on every runway at both ends and enables a pilot to locate the runway and come down in the center of it.

▼

Snow-Melting System Proposed for Airports

(*New York Times, Feb.* 18, 1945)

During the past December and January airports in many states were closed down for days by heavy snows, drifts and ice ruts. One large metropolitan airport, with $100,000 invested in snow-removal equipment, had to cancel more than 300 flights over one five-day period because its runways were operated only on an emergency basis for almost a month.

In some industries underground snow-melting lines cope with this problem. Hot water in the lines melts snow on truck driveways and crosswalks and also evaporates the resulting water. The same principle can be applied to airports.

Engineers believe that 1-in. to 1¼-in. wrought-iron pipelines spaced about a yard apart, and formed into grids of approximately 1,000-ft. circuits, will keep runways clear. Steam from the airport's boiler house could be fed into a small underground heat exchanger in each circuit for conversion into hot water to be circulated by pump. With the temperature of the runway raised to 40 or 45 degrees the heaviest snowfall would melt quickly. The cushion of warm air that would form immediately above the runway surface would rapidly absorb the water so that it would evaporate. Such a system would have to function only during the few days when snow falls.

At present the cost of removing snow at an airport which serves an area with a million population runs about $200,000 annually. This includes the annual charge for equipment and labor and the revenue lost by canceled flights. If the underground snow-melting system could be bought and installed for $3,000,000, the annual interest on the investment, plus operating and maintenance costs, would amount to less than is now being spent. Flight schedules could be maintained the year round, except for the usual bad weather. As one commercial airline pilot affirms: "It isn't snow in the air that makes flying hazardous; it's snow on the runways that we must land on and take off from."

▼

St. Paul, Minn. (pop. 287,000) reported average snow expenditure of $125,000, or $2,000 per inch. It owns 3 blowers, 6 graders, 15 heavy and 22 light plows and 24 all-wheel-drive snow trucks.

A New Blue Brute for New Rock-Busting Jobs

Enough crushed rock for today's needs plus those of the postwar future (like Pennsylvania's $500,000,000 Postwar Highway Program, for example) is an order that will take plenty of top-rate drilling.

Already Worthington's improved UMW Wagon Mounting with its 4" WD-40 Drifter is keeping quarries hot with its speedy, powerful, easy drilling. It's the wagon mounting you'll want for your new jobs — and, like other Blue Brute products, it's available today.

This UMW-40 is the most versatile machine in the business. Drills holes in any direction and at any angle. U-arm may be swung in any position from vertical to 45° below horizontal. Two rear wheels may be turned through 90°, thus permitting line drilling close to a face. 6-foot nominal steel change.

Its many other advantages — plus the savings in maintenance cost you get with portable Blue Brute Compressors — the ones with the famous easy-breathing Feather* Valves — mean more air per compressed air dollar and more holes drilled per day.

Investigate Blue Brutes. Try 'em—buy 'em. Nearest distributor listed on page **81.**

*Reg. U.S. Pat. Off.

**Blue Brute Compressors and Air Tools are painted olive-drab for the Army and battleship-gray for the Navy.

Behind the Fighting Fronts with

Blue Brutes

In today's mechanized warfare, Blue Brutes** help prepare the way — repair bridges, roads, tunnels, set up fighting positions, build landing fields. At home, in Army Camps, Navy bases, Blue Brutes are at work. They'll be ready, postwar, for the construction projects now being planned for peacetime jobs and improvements.

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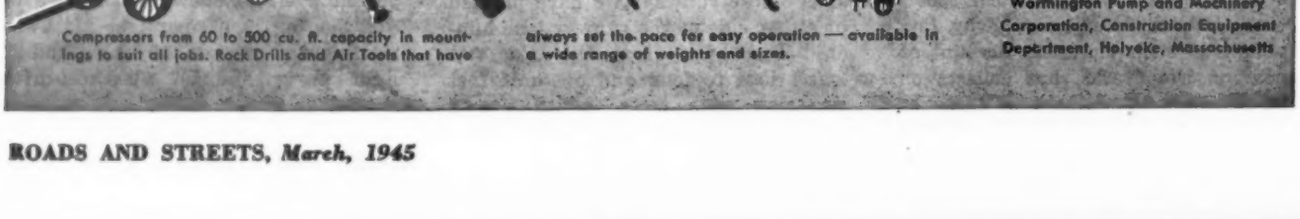
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(*Continued from page* 60)

are under consideration some $33,000,000 worth of highway construction that can be carried out with federal assistance. Requested attention "to provide a more systematic method of financing highway construction and maintenance in the future, than we have in the past."

Massachusetts—Governor Tobin, in budget message, recommended additional 1 cent gas tax, 3 cents tax on aviation gasoline, and other additional taxes in request for a revision of the state tax structure. Stated that the ¼ cent gas tax would be retained until the post-war highway construction program is completed. Recommended planning "for an extensive program of highway construction with greater attention to the traffic problems of our urban centers."

New Jersey — Governor Edge recommended post-war construction of scenic highways on which moderate tolls would be charged and asked authority from the legislature for building such toll roads. Recommended liberalization of workmen's compensation and unemployment benefits.

Utah—Governor Maw asked for increase of gas tax from 4c to 5c without any exemptions and that proceeds of 1c be spent on secondary roads. In his budget message he urged that present sales tax reserve, now $5,500,000 be built to $10,000,000. He requested defeat of the anti-diversion constitutional amendment SJR 1, and defended use of some motor vehicle funds by Publicity and Industrial Development Department as necessary for post-war industrial expansion. The state will be entitled to about $4,800,000 per year of federal-aid and the 4c gas tax does not provide enough revenue to maintain an adequate road system.

▼

Post-War Job and Salary Question a Live One!

Here is an interesting letter in answer to the article, "Road Building to Need Young Men," by W. H. Root, maintenance engineer, Iowa Highway Comm., Des Moines.

C. M. Hall, Major, CE, Post Engineer, Sedalia Army Air Field, Warrensburg, Mo., replied to Mr. Root:

"I have just read your interesting item 'Road Building to Need Young Men' concerning the problem of highway personnel returning from military service and the need for attracting capable young men to highway organizations, as summarized at the annual meeting, Association of State Highway Officials, last month at Cincinnati and published in the December 1944 issue of ROADS AND STREETS.

"The article was very timely and indicated considerable research in its preparation, in fact the second part of the question was presented in such detail that I wonder why more consideration was not given to the first part of the question rather than pass over it with the explanation that returning employees from military service must be put back to work in their old positions if they are physically fit.

"Having been in the service myself for nearly three years you can readily see why I am interested in the first part of this question, particularly as it refers to the same job at the same salary. In other words, three years have elapsed since the present conflict was begun and so many employees entered the military service. During this time living costs have increased, and justly so, many employees remaining in the highway personnel have received increases in their salaries. Have not those employees who entered the military service received such a varied experience that it would make them more valued employees and, therefore, warrant similar increases in pay when they are put back to work as received by those who remained with their departments?

"I trust I may cite myself as an example of many of those who no doubt would fall within this category. Since taking military leave from a highway department of a central western state, it has been my privilege to serve as Engineering Officer in the construction of a large ordnance plant, as Operations (construction) Officer in the building of a triangular division cantonment and as Post Engineer in charge of both construction and maintenance at an army air field. During this time as the accountable officer I have both directly and indirectly supervised the expenditure of sums in dollars ranging into eight figures for which I have been rewarded and would not trade the experience for any cash value.

"This subject might reasonably be treated in the same manner as one that was published in the December 9, 1944, issue of the Saturday Evening Post by an ex-marine on the subject of education for returning service men of school age.

"It is not intended by the above to censure any portion of the article appearing in the Roads and Streets, but rather to give the view point of those who in the service hope to sometime return to their old employment."

Editorial

Wartime Pavement Neglect

THE severe thaw is bringing more than ground water to the surface, this fourth wartime Spring season. In many cities Spring has brought a fresh realization of the consequences of neglected street maintenance. Makeshift repairs and postponed maintenance double and triple street upkeep costs in the end, and wise city authorities are laying by funds to take care of the trouble they know will eventually be in store due to forced skimping today, whatever its cause.

Some cities have had to postpone street repairs for lack of workers or equipment or for other strictly wartime reasons. But very often the reason is the familiar one of money—financial distress or simply failure to appropriate necessary funds. Apparently as an example of the latter situation, an Eastern city recently found the condition of its streets aired on the front page with the superintendent of streets under fire for the "ruined" condition of many of that city's pavements. In explaining the condition he pointed to a long period of financial skimping by the city council, dating back through the 1932-35 depression years. Seemingly the city fathers, after cutting street appropriations during those years to a small fraction of normal, never restored the repairs and replacements budget to the pre-depression level. Naturally, when war restrictions dictated holding such work to a "bare minimum," the streets broke down rapidly because for them the war had already been in progress for a decade.

Well-paved, attractive streets have come to be regarded as a badge of a city's municipal health and prosperity. This badge is due to be shined up after the war, when as a matter of safety and economy we are sure to see a renaissance of street improvement entirely aside from the much-talked-of development of expressways.

▼

Better Cost Keeping

"MUST" reading is the article in this issue analyzing cost trends in highway construction in one Western state since 1920. The post-war job of highway engineers is not merely to build better highways, but to do so at the *lowest cost consistent with the road service desired.* Experience has shown that contractors will contribute a maximum dollar's worth if allowed to compete with the most modern equipment under the competitive system; on some items, notably earth moving, better equipment has dramatically lowered unit costs. Highway and street departments can make an equal contribution by keeping books on the whole or cumulative cost per mile of the many road types including maintenance, as a basis for checking their judgment on type selection and design standards.

▼

Road Builders and Airports

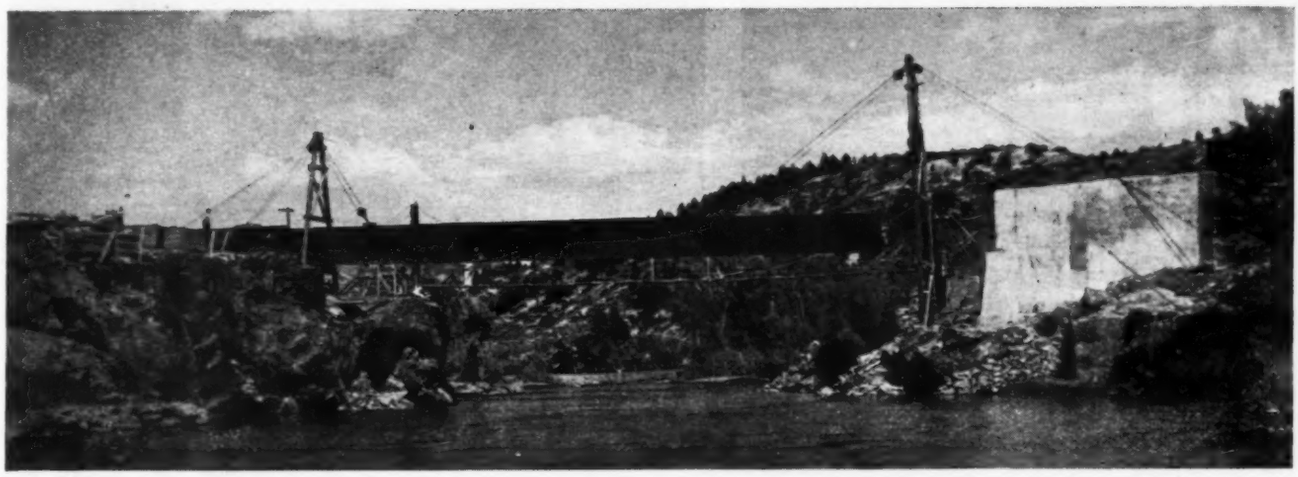
THE highway industry's close relationship to civil airport development is nowhere better shown than in an analysis recently made by the American Road Builders' Association. The road building fraternity has a direct interest in 92% of the funds that will be spent for airfield development after the war. In other words, the big show will center around grading, paving and drainage. Whatever the governmental agencies—federal, state, local—which may be designated or created to carry out the coming billion-dollar airport program, it will fall to the lot of engineer and contractor personnel trained largely in highway work to carry out the job. As in the recent past, the experience gained in each field will accelerate engineering and job-methods progress in the other.

▼

Who's the Gainer?

THE government's recent spot sales of surplus road and construction equipment naturally came up for an airing at the AGC annual board meeting held this month in Chicago. The contractors are concerned over the fact that the Surplus Property Act regulations favor disposal to governmental units, which thus outfitted at bargain prices may compete with private contract.

Many of the units put up on the block have consisted of ancient rigs that graduated from WPA, CCC and Alcan work. If the stuff offered continues to be at or near the junk level and bid prices continue to be as high as they have been, the contractors are missing out on few bargains, and should be glad that Treasury Procurement's sales favor street and highway departments.



Showing first girder as it was being drawn across the stream by pulley lines

Girders Set with A-Frames 50 Miles from Nearest Railroad

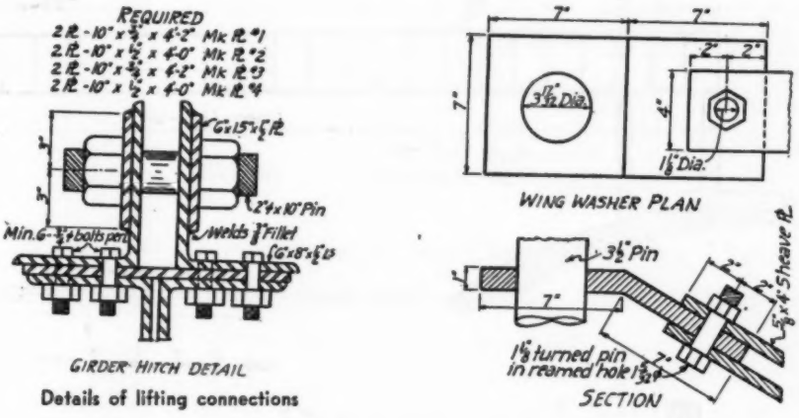
Modern mobile handling and hoisting equipment: none available. Erection falsework: stream velocity ruled out. So 124½-ft. girders were snaked across with A-frames, block and tackle and rollers

HIGH in the back country of mountainous southern Colorado, a resourceful job of wartime bridge erection was done during the 1944 summer. The bridge in question is the new US 50 deck girder span over the Gunnison River near Sapinero, the longest highway span of this type ever erected in Colorado. Begun before Pearl Harbor to realign the stream crossing and replace an obsolete truss, the project had been halted but was revived when a truck went through the old span early in 1944 tying up traffic from Canon City to Grand Junction.

The new bridge has an R/C deck and provides a 30-ft. clear roadway with 2-ft. walks on either side. The four steel girders were trucked through the mountains to Sapinero in three sections each (two sections 44 ft. 3 in. and one 36 ft). The assembled girders measured 124 ft. 6 in. by 7 ft. 0½ in. and weighed about 25 tons each.

Expediency Due to Lack of Equipment

The general scheme of erection is shown by the photographs and sketch. In fairness to all concerned it should be pointed out that the manner of erection was not considered modern or efficient, but was the answer to a specific problem, its only unusual fea-



Details of lifting connections

Nearest girder in place, second grader being set. This view clearly shows details of handling

The temporary bridge just before high water took it out

Deck nearing completion. Center panel being concreted

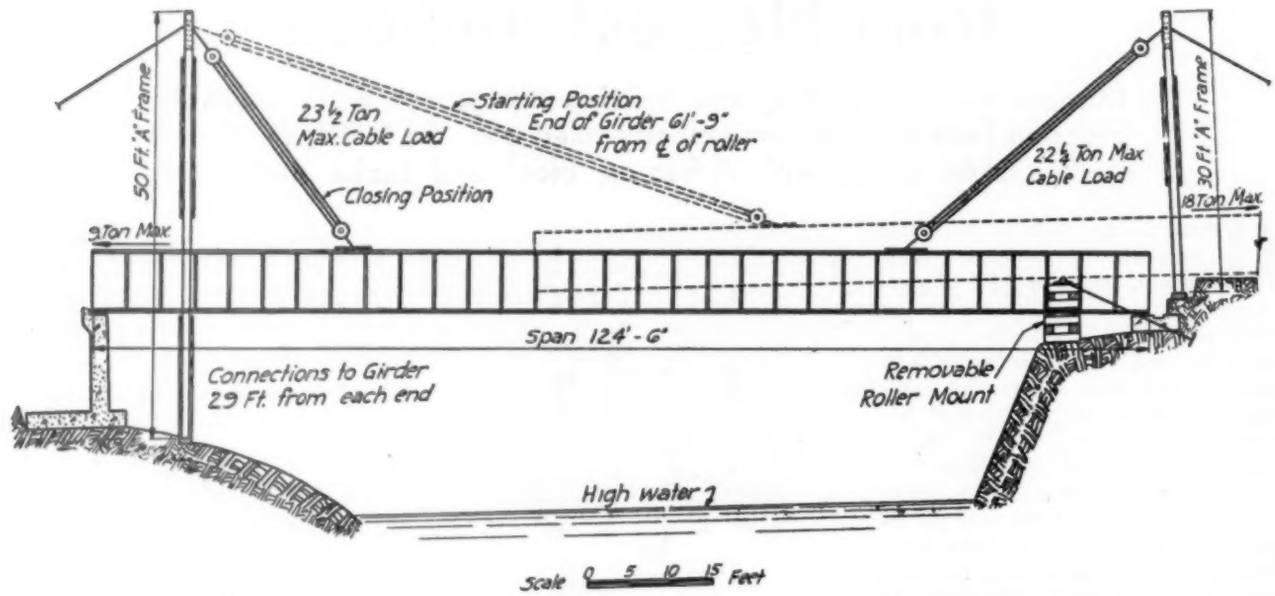
ture being that it allowed the use of the inadequate equipment at hand. Isolation from the nearest standard gauge railroad plus mountain grades made use of heavy construction equipment impracticable. Standard mobile equipment also was not on hand, and even if it had been available the depth and velocity of the stream ruled out falsework.

A third phase of the problem was lack of hoisting capacity. The only equipment available had a 4-ton limit.

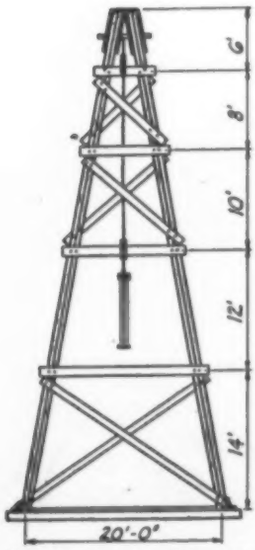
How Girders Were Set

The process of moving the girders is quite obvious from the sketch shown and the operation is as follows:

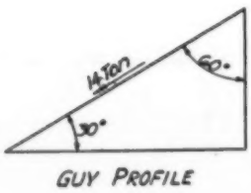
1. A suspension foot bridge was constructed near the new bridge in order to transfer materials across the river. "A" frames respectively 30 and 50 ft. in height were constructed on either side of the river for use in placing the girders in position.



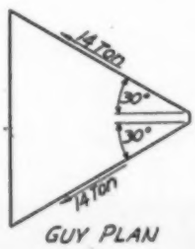
General scheme of erection



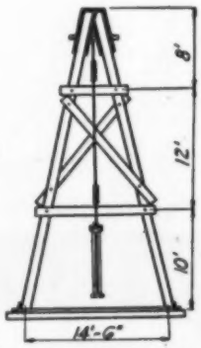
ELEVATION 50 FT. 'A' FRAME



GUY PROFILE



GUY PLAN



ELEV. 30 FT. 'A' FRAME

One of the rollers used in erection. Note channels cut in roller, spaced to clear lines of rivet heads in the bottom flange of the girder

2. After assembling each girder it was pulled to a position of approximate balance on the roller mount by use of the block and tackle extending from the 50-ft. A-frame.

3. At this position the holdback tackle, indicated at the right side of the sketch, was attached to the girder.

4. The girder was moved from the balance position to the position where the connection for the block and tackle of the 30-ft. A-frame was directly over the roller, by pulling from the 50-ft. A-frame and at the same time slacking the holdback tackle. The triangle of forces during this operation consisted of a diagonal force along the block and tackle, a verticle force at the roller and a horizontal force on the holdback.

5. The right-hand block and tackle was attached, as was the horizontal pulling tackle.

6. The girder was raised sufficiently to clear the roller, and equilibrium was maintained by the two diagonal tackles and the horizontal tackles. Movement was accomplished by pulling from the left side and slacking on the right side.

Expansion Details

Expansion is provided by an 11¾-in. rocker under one end of each of the four girders.

At the fixed end of the bridge an expansion joint for the concrete deck was effected by placing 12 ga. sheet under the slab, and making an open joint through the sidewalk and hand rail pedestal in a plane with the inside face of the parapet wall. This was done to avoid rupture of the deck at the wings from vibration and deflection.

A. S. Horner, the contractor, shown here on another bridge job with A. B. Batten of the Colorado highway department

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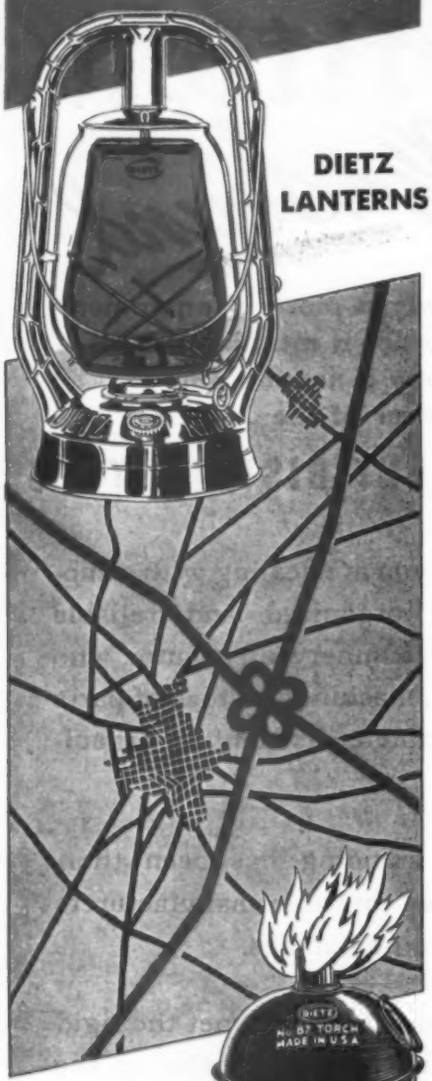

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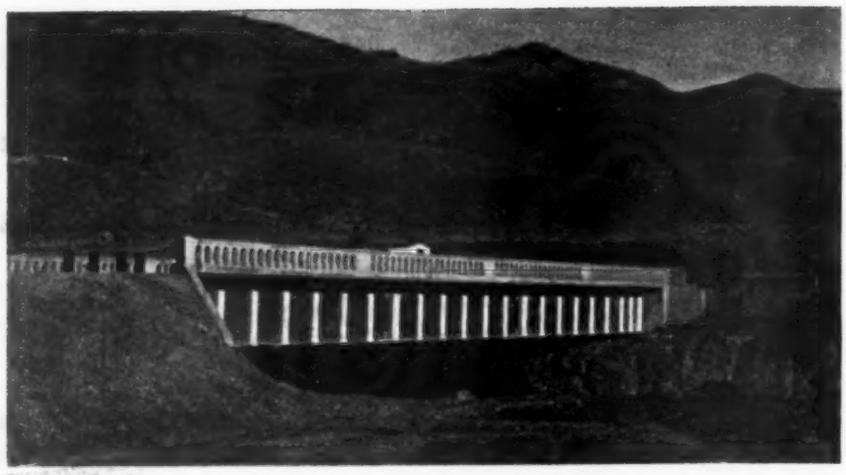


The finished bridge—Colorado's longest deck girder span

One end of the bridge is at the P.T of an 8° curve. The full length of the bridge is in transition from 18 in. superelevation at the P.T. to a normal 3-in. parabolic crown at the other end. The superelevation is transmitted to the deck by stepping the bridge seat. In order to complete a uniform transition in the deck, templates were placed at intervals of 10 ft. transversely to the deck. The concrete was struck off longitudinally.

Completion of the 8½-in. deck slab, incidentally, reduced the camber in the girders from an initial two inches to one inch.

A temporary bridge and approaches was constructed about 500 ft. from the new bridge site during construction. This bridge was washed out with high water and again constructed when the water receded.

▼

Acknowledgments

The foregoing project was designed by the Colorado state highway department; Paul S. Bailey, bridge engineer, and erected under the supervision of D. W. Ormsbee, construction engineer, J. R. Cheney, div. engr., with R. R. Wattelet as project engineer. A. S. Horner, of Denver, was the contractor and Crocker and Ryan, civil engineers, Denver, acted as consultant for the contractor on the erection methods and other engineering.

▼

Gov. Dewey's Proposal Includes $145,000,000 for Highways and Separations

A public works program of $207,500,000 was proposed recently by Gov. Dewey in outlining a "pay as you go" policy to the New York state legislature. He proposed the immediate freezing of $87,000,000 1945-46 state surplus funds before its acquisition, a proposal which if accepted would increase postwar construction funds in sight to $40,000,000.

The $207,500,000 includes $37,000,000 for highway construction and reconstruction; $29,700,000 for highways; $29,600,000 for parkways and $48,800,000 for grade crossing elimination.

The governor specifically recommended:

1. Cancelling $108,000,000 previously made bond appropriations for highways, parkways and grade crossing eliminations, such work to be financed by the postwar fund.

2. Total state assistance to municipalities of $272,500,000—highest in state's history.

While stressing the necessity for the proposed state program of thruways Gov. Dewey left open the question of whether toll revenue must be planned.

▼

Belgian War Road Rivals Red Ball Express

After the Channel ports fell to the Allies, the U. S. Army Transportation Corps was able to utilize railroad facilities and discontinue its Red Ball Highway, over which more than 500,000 tons of supplies had been carried in its 81 days of existence.

Addition of the Belgian port of Antwerp to the Allied supply chain gave birth to the ABC (American-British-Canadian) Highway. It stretches across ancient cobblestones, dirt and modern concrete from Antwerp to advance depots on the western front.

The magnitude of the ABC motor convoy operation can be understood from the fact that 20 truck companies are needed. Ten-ton tractors, in units of 13, roll in and out day and night. Lieutenant Colonel A. E. Parrott, of Mart, Texas, commanding officer of the 466th Truck Battalion, commands this operation.

Price Trends in Highway Construction

Increasingly better equipment is the main factor in the 1920-1940 downward cost trend, according to this authoritative analysis, which by the way contains food for postwar thought

By R. H. BALDOCK
State Highway Engineer, Salem, Oregon

IN THE preparation of budgets and estimates on future construction work, it is very essential to know the trend of prices on the various components of highway construction work and to keep abreast of current prices. The Oregon State Highway Department has long realized the necessity of having this up to the minute information. Price trends have been developed over a period of years by E. H. Clymer, cost analyst, and a brief review showing the trend of prices during the past twenty-four years gives some very interesting information.

A Brief Summary of the relationship between the salient costs of present highway construction in comparison with such costs for past years

Item	Unit	Average Bid Price 1920	1927	1937	1940	1944
Common excavation	cu. yd.	$0.50	$0.36	$0.20	$0.156	$0.35
Solid excavation	cu. yd.	1.41	0.79	0.56	0.423	1.00
Overhaul	sta. yd.	0.052	0.045	0.011	0.008	0.02
Truck haul on excavation	yd. mi.	Before truck haul	0.23	0.121	0.095	0.20
12-in. corr. iron culvert pipe	lin. ft.	1.64	1.57	1.05	1.48	None used.
18-in. corr. iron culvert pipe	lin. ft.	2.47	2.53	2.15	2.07	Frozen by
24-in. corr. iron culvert pipe	lin. ft.	5.09	3.36	3.09	3.12	W.P.B. order
12-in. concrete culvert pipe	lin. ft.	1.35	1.34	1.10	1.28	1.41
18-in. concrete culvert pipe	lin. ft.	2.89	2.44	2.34	2.18	2.90
24-in. concrete culvert pipe	lin. ft.	3.98	3.30	3.14	2.91	3.89
Surfacing material pit run gravel	cu. yd.	2.88	0.98	0.49	0.48	1.05
Surfacing material crushed rock base	cu. yd.	2.91	2.03	1.48	1.15	2.25
Surfacing material crushed rock top	cu. yd.	2.95	2.09	1.57	1.34	2.31
Crushed rock in stockpile	cu. yd.	2.93	2.08	1.71	1.38	2.94
Asphaltic concrete pavement	ton	8.35	5.75	4.75	4.98	6.05
Portland cement conc. pavement	sq. yd.	2.95	1.62	1.57	1.58	2.63

A brief summary of the fundamental changes in costs of typical bid items of construction and the various reasons which caused these changes.

Common Excavation

The average bid price of $0.50 in 1920 decreased to $0.36 in 1927, to $0.20 in 1937 and to a low of $0.156 in 1940.

Better equipment and diesel power have been the predominating factors in reducing the cost of excavation.

In 1920 teams, fresnos and hand labor were commonly used. By 1927 gasoline powered shovels and slow solid rubber tired trucks had replaced the horse and fresnos. By 1937 pneumatic tired 12-cu. yd. carrying scrapers and large bulldozers powered with 95 H.P. diesel tractors had practically eliminated all other means of moving common.

During the period just preceding the war, the size of the scrapers in use had increased to as much as 34 cu. yd. and four wheeled, self-powered scrapers and carrying trailers were becoming increasingly efficient in the handling of dirt, especially on long hauls. Gasoline or diesel powered shovels and trucks were still used on hauls over 5,000 ft.

Other factors which have helped to reduce costs are: Wider roadbeds which permit the use of larger equipment, large sized jobs which warrant the expense of owning and moving in large and heavy equipment, and improved highways which have made the new projects more accessible.

Solid Rock Excavation

The average bid price of $1.41 in 1920 decreased to $0.79 in 1927, to $0.423 in 1940.

Better equipment and diesel power were again the predominating factors in reducing costs. In 1920 the compressors, jack hammers and drill steel were not efficient in comparison with later and more improved tools. Considerable drilling was done by hand labor methods. Explosives were not up to present standards and considerable black powder was used. On many jobs the rock was picked up by hand, loaded into small mine cars and hauled to the fills. Steam shovels and wagons were used on some jobs but were not efficient. On some large jobs railroads were constructed and steam shovels loaded onto small railroad cars. By 1927 the gasoline-powered shovel and solid-rubber-tired trucks were commonly used. The air compressor and jack hammer had been improved and hollow drill steel was employed in drilling. By 1940 the air compressor was diesel powered, the jackhammer had been further improved, and detachable bits were used on drill steel. Explosives most suitable for each type of rock had been evolved and electric exploders which set off several charges of explosive simultaneously gave better fragmentation. Shovels were faster and loaded into pneumatic tired trucks, some of which had a capacity of 12 cu. yd. For hauling on some jobs 25-cu. yd. buggies mounted on 16 pneumatic tires and pulled by a 95 H.P. diesel tractor were employed. The use of the diesel engine on a large share of the equipment in use had reduced fuel cost about 65%.

Overhaul

The unit bid of $0.052 in 1920 decreased to $0.045 in 1927 to $.011 in 1937 and to $0.008 in 1940.

The large decrease in cost from 1927 to 1937 is directly traceable to the use of carrying scrapers pulled by diesel-powered tractors, and to pneumatic-tired trucks.

Truck Haul

In 1920 excavation was wasted and borrowed to prevent the necessity of hauling material over 1000 ft. By 1927 trucks were improved enough to permit truck haul of material, but the cost was extremely high, the average bid price being $0.23 per yard-mile. Use of pneumatic-tired trucks reduced this cost to $0.121 by 1937 and the further advancement in trucks plus the use of self-powered scrapers and carrying trailers further reduced the cost to $0.095, in 1940.

Corrugated Iron Pipe

The sizes most commonly used, 12, 18 and 24-in., show a reduction in cost from 1920 to 1940, although the quality had been improved by coating with asphalt and by paving the invert. However, prices of pipe are relative to the distance it must be transported from mill to job and yearly cost trends are not conclusive

unless each job is analyzed as a single unit.

Concrete Culvert Pipe

The cost of concrete pipe, as with corrugated iron pipe, shows a reduction in cost from 1920 to 1940 (17%). Quality of the pipe was materially improved by using balanced reinforcement and providing higher compressive strength. As with corrugated iron pipe the cost of pipe is relative to the distance transported from factory to job.

Pit-Run Gravel or Talus Surfacing Material

Better equipment again is the reason for the reduction in cost. Hand labor and teams were used for loading and hauling in 1920, gas shovels and solid rubber tired trucks in 1927. Change-over from teams to mechanized equipment resulted in the greatest reduction. Diesel shovels and fast pneumatic-tired trucks accounted for a further reduction by 1937. Methods of transporting materials advanced slightly from 1937 to 1940 but costs of loading and street work remained fairly constant. No material change in bid prices were noted during the latter period.

Crushed Rock Surfacing Material

Average bid price of $2.93 in 1920 decreased to $2.07 in 1927, to $1.59 in 1937 and to $1.29 in 1940. As in the case of other items, the use of trucks for transporting materials was the predominating factor. Also, larger and better crushers and screens tended to increase the production of the crushing plants with a consequent lowering of production costs. Improved method of drilling and shooting reduced the cost of quarry operations. Contractors have also taken advantage of the possibilities of semi-portable crushing plants mounted on pneumatic tires, which reduced the cost of moving and setting up, in turn reducing production cost.

Asphaltic Concrete Pavement

The comparison of costs of asphaltic concrete pavement showed a marked decline from $8.35 a ton in 1920 to $5.75 a ton in 1927. Improved methods, better equipment, and lower priced aggregate and asphalt all contributed. Another factor was competitive bidding. During the early years of asphaltic concrete pavement very few contractors had sufficient equipment and knowledge to be able to bid on this type of paving. Consequently, the few who were able to successfully obtain and prosecute the work bid with the knowledge that their high bids would be favorably considered.

The further decline in costs from $5.75 in 1927 to $4.63 in 1937, was again accounted for by better equipment. The $4.98 average cost in 1940 is a nominal variation from the 1937 average and does not indicate a definite trend.

Portland Cement Concrete Pavement

Portland cement concrete pavement costs show the same general decline as that shown by other contract items. Reasons for this decline are: The use of improved and larger pavers; improved trucks for transporting materials; better designed equipment using more mechanically operated machines such as the bullfloat and strike-off machine with tamper and vibrator; less hand labor, and lower material costs.

While the price has been reduced, the quality has been improved. In 1920 the standard thickness of pavement was 6 in., in 1940 it was 9-7-9-in. The strength has also been increased from 2,500 to 3,500 psi. after 28 days curing. This increase is due to more scientific mixing and not use of more cement. In fact, less cement is now used than was required 24 years ago.

Increased Prices 1940-1944

The cost of highway construction steadily decreased from 1920 until 1941 when the imminent outbreak of war caused prices to climb. The increase in bid prices shown for the year 1944 over similar bid items for 1940 were caused by the following:

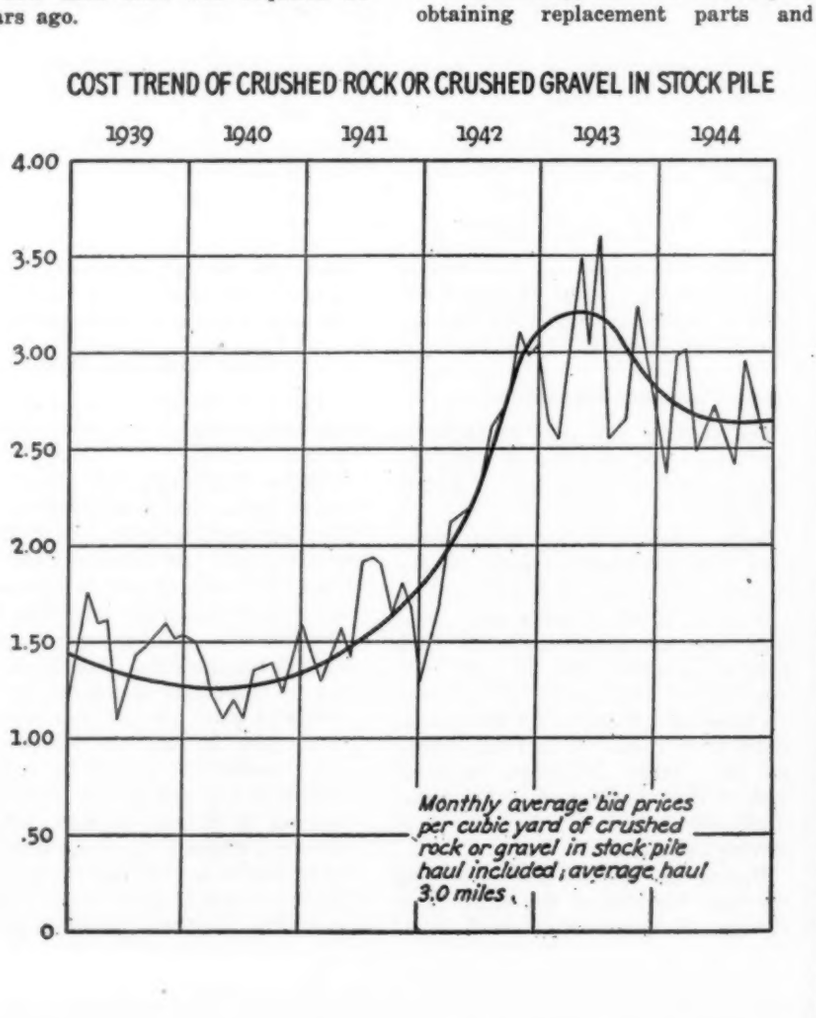
(1) Outbreak of war sharply reduced the supply of available labor due to the heavy induction into the armed services.

(2) Heavy concentration of shipbuilding and other war industries with extremely high wages caused a further drain on construction labor and resulted in a marked increase in the cost of labor to the contractor.

(3) Rapidly mushrooming war industries and the need for a large number of air fields and Army and Navy camps created an enormous amount of construction work and reduced the effectiveness of competitive bidding.

(4) The uncertainties of being able to carry on construction and the increasingly heavy tax burden caused contractors to bid higher so as to have a larger margin of safety.

(5) Curtailment in production and sale of trucks and other construction machinery, and the difficulty in obtaining replacement parts and



tires, necessitated the use of old equipment in poor repair, which decreased efficiency and slowed progress of work.

Summarizing the reduction in construction costs from 1920 to 1940, the decline is traceable to the more efficient construction machinery, pneumatic tires, gasoline and diesel powered equipment, less hand labor, lower material costs ,and to improved and more efficient methods. In following the trend of costs it is probable that after the war increased efficiency and new developments in construction machinery will decrease the cost to or below the 1940 levels. It is possible that labor will not return to prewar levels, but the increased efficiency will more than compensate. During the period of 1920 to 1940, wages on construction were increased about 50% and during the same period the bid prices were reduced by 20% to 80% on the various components of highway construction.

Monthly Price Trend of Crushed Rock

A review of the month by month price trend of crushed rock from January, 1939 to December, 1944, as shown on the accompanying graph is an example of how the Oregon State Highway Department keeps abreast with current prices. This graph shows the gradual increase in price from a low of $1.10 per cubic yard in July 1940 to a high of $3.65 per cubic yard in July, 1943, and then a decline in prices to $2.55 per cubic yard in December, 1944.

The large increase in prices was due to the war, which caused a large Federal construction program, scarcity of men and equipment, high wages, and high income taxes, all of which are reflected in the bid prices. After July, 1943, the federal construction program started to decline, more men and equipment were available, and the contractors again became interested in the state highway rock production projects, which facts are reflected in the bid prices. The irregularity of prices from month to month reflects the nature of the quarries or gravel pits, the length of truck haul, and the competition of the contractors interested in the projects.

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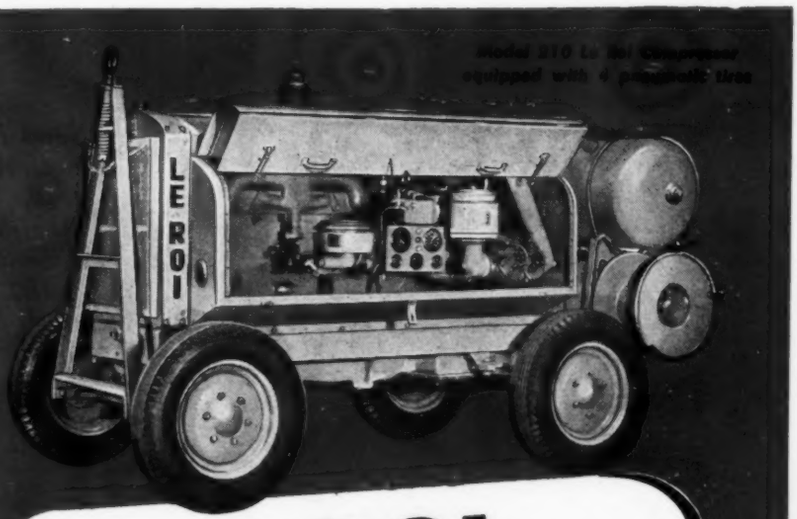
Kansas will have fewer miles of roads after the war, if legislation sought currently is passed. A bill introduced in the legislature to reduce the number of school districts has raised the parallel thought of eliminating little-used local roads with a view of reducing maintenance costs.



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How Alabama Cuts Expansion Joints in Concrete Roads

Here's how the Alabama state highway maintenance forces go about cutting joints in concrete pavement, when needed to provide additional space for growth or progressive expansion of the slab.

According to Geo. W. Phillips, chief engineer, decision as to need for cutting of joints, and spacing of cuttings, is arrived at from careful inspection of the pavement. "From past experience," he explains, "we have felt it desirable to cut joints before there was any considerable indication of distress and to space the cut joints so that another joint could be cut, at midpoint, if it became necessary. In pavement with original 40-ft. spacing of expansion joints, we generally cut every eighth joint, giving spacing of cut joints as 320 ft., with further cutting every fourth joint, giving eventual spacing of cut joints as 160 ft. This spacing is varied when deemed desirable if certain joints indicate greater distress than others, or due to effect of grade line or other considerations."

Equipment used consists of air compressors, wagon drills, jack hammers and paving breakers. A line of holes is drilled across the pavement on one side of the expansion joint and the concrete between these holes cut out with paving breaker. The cut joint is then filled with a mixture of cotton seed hulls or sawdust and cutback asphalt.

Where jack hammers are used, they are kept in proper line by a template or guide made of timbers. Removable jack bits are used.

To interfere with traffic as little as possible, the outfit moves up one side of the pavement, cutting the joint to the center line, then cutting the joint on the other half.

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Pier Forms Built on Side

Every so often a bridge contractor finds it to his advantage to build his pier forms on the ground in sections and hoist them into place. This was the case on the bridge which Henley-Lundgren Co. of Worcester, Mass., is building currently in the town of Lebanon, N. Hampshire. The structure consists of three continuous girder spans of 114, 150 and 114 ft. or 378 ft. total with concrete deck having a 28-ft. clear roadway.

The two reinforced concrete piers each consists of two tapered shafts about 40 ft. high and 7 x 9 ft. outside dimension at top of footings, the shafts being tied at the top by an arch to form the bridge seats. Mr. Lundgren, acting as supt., decided that time and labor could be saved by prefabricating the forms for the two shafts in two sections each and having the lower sections ready to set up in a matter of minutes as soon as the footing hardened. The same time advantage applied in setting the top form sections and completing the pour. Forms, which were reused on the other pier, were of conventional plywood construction. Erecting the sections on their sides as pictured proved more convenient than doing so in place. A couple of short ladders were used by the carpenters but the crane was needed only in setting the completed sections.

Facts and photos from H. E. Langley, bridge engineer, N. Hampshire state highway department, and F. M. Auer of the bridge staff.

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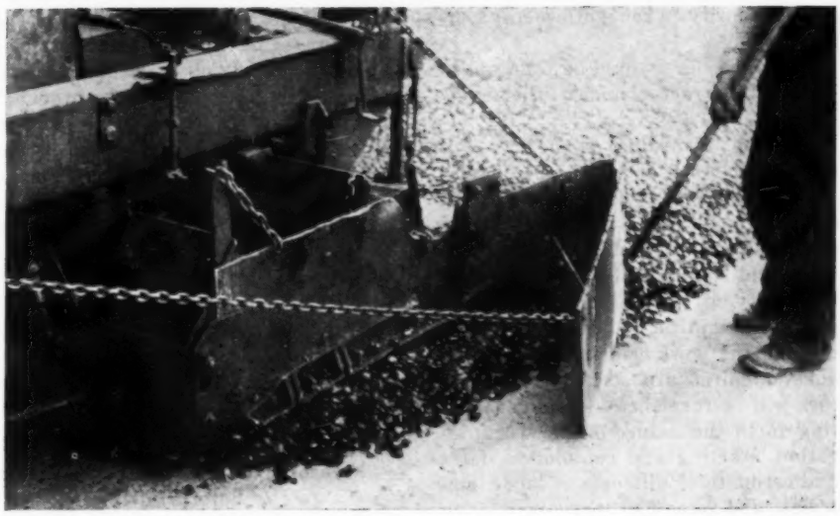
Center Curb Forms for Converting Old Pavement into Divided Highway

In reconstructing and widening a section of the Nehalan Highway near Astoria, Oregon, an old concrete road was used by the state as the base

under the inner lanes of a 4-lane divided highway. The accompanying scenes show how the contractor, J. A. Terteling & Sons, Inc., of Boise, Ida., constructed the forms for casting a 24-in. wide center dividing curb. This curb was designed to rest on the old slab without ties or reinforcement, being cast in segments about 15 ft. in length. Forms of usual detailing were held in true line by bracing them between heavy 8 x 16 timbers as shown. Ready-mixed concrete was used. Base widening was later provided for four lanes and a 2-course asphaltic concrete topping placed.

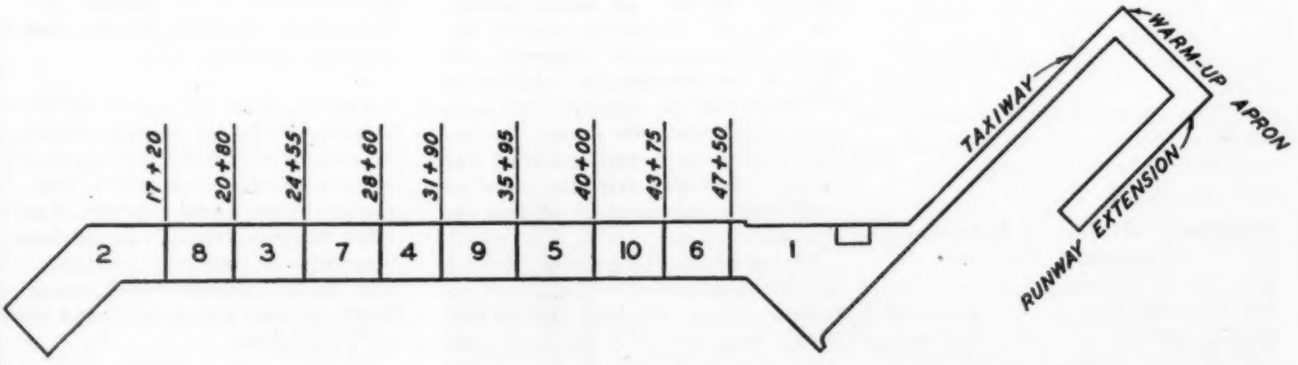


Spreader Wing Helps Feather Hot-Mix at Center Line

Where a hot-wax asphaltic application is being put down half width at a time, the material is sometimes leveled along the edge with hand rakes. A more uniform job of feathering was done and labor saved on Mercer-Frazer's recent U.S. 101 contract in northern California by constructing this simple sheet iron wing on the side of the spreader. The binder course of a resurface job is being placed here, using a new "open" mix deficient in fines, which the highway authorities in the Eureka district have tried out for the peculiar climatic and drainage conditions of the region.

Concreting Sequence for Big Apron

A long concrete parking apron built at March Field, Calif., during 1944 was paved in ten alternate sections as shown in sketch. About 170,000 sq. yd. of concrete was involved. As related in *Southwest Builder & Contractor*, this was done to allow operation of the airfield during construction. Matich Bros. and E. C. Yaeger, contractors. This sequence permitted the paving equipment to be moved progressively along the apron in one direction and then back again with minimum waste travel.



Contract System Threatened by Proposed Federal Law

UNDER the terms of H.R. 2030 recently introduced in Congress, according to an ARBA news letter, competitive bidding on highway projects and other public federal works would be substituted by a new scheme embodying a combination of negotiated and management form of contract. Purporting to protect the government from profiteering and to remove the causes of unfair trade practices in public construction, the new measure would set up a "Construction Contract Ratifying Committee" of three members. Appointed by the President, it would have final authority over approval of all construction contracts entered into by any government agency. The committee would have authority to renegotiate any contract.

This procedure would be followed in letting contracts under this new scheme:

(1) The awarding authority will submit to prospective contractors, either by special invitation or general advertisement, a questionnaire on their qualifications. Based on these returns and supplemental investigations the ratifying committee may wish to make, the contractor best fitted to undertake the work will be selected. As questionnaires are sent out, contractors will be furnished a statement setting forth the nature of the work, location, starting and completion dates and estimate of all costs of labor, materials and fees.

(2) After contractor has been selected, awarding authority will negotiate with him to establish a lump sum fee for his services. Then the general contractor is required to negotiate contracts with all subcontractors on the basis of a lump sum for the work to be performed including all elements of cost and a specified fee for services of each subcontractor. Should the general contractor be qualified to perform certain parts of the work himself, he is permitted to negotiate for it on a lump-sum basis just as though the work were being sublet to another contractor. All contracts subject to approval by the ratifying committee.

(3) Extra work done by a subcontractor or by a general contractor must be negotiated in advance on a lump sum basis.

Importance of Work to Determine Contractors' Fees

Setting up criteria for deciding allowable compensation, the proposed measure provides that fees of the general contractor, as well as subcontractors, shall be determined by the importance of the work, the skill required to properly execute the contract, and the time estimated to be necessary to complete the work. Such fees include the cost of overhead items such as central office for estimating, purchasing, expediting, accounting, financing and general supervision.

Embodying the principle of renegotiation the bill requires that before final payment is made the contractor's books, as well as all subcontractors', are to be audited by the committee to determine the true overall cost, the total profit or compensation, including that on extra work. It is specifically provided that in no event can the total compensation exceed the sum agreed to at the time of negotiation. When the job is completed and certified by the awarding authority, the ratifying committee then determines whether profits in excess of those agreed upon have been made by the contractor. If it is found that compensation in excess of agreed amount has been paid, contractor is required to promptly repay any such amount. No provision is made to reimburse the contractor in event a loss is sustained in connection with the work. As a matter of fact other provisions of the bill specifically preclude the adjustment of losses.

Measure Would Destroy Private Enterprise

Regardless of the many valid objections, too numerous to even mention here, one thing is certain—the operation of any such law will discourage if not destroy private initiative and consequently private enterprise in the field of public construction. Such a scheme ignores the advantages of competitive bidding which form the very basis of economic operations in the construction industry. There may be a place for negotiated contracts during periods of war and some excuse for renegotiation when normal economic balances no longer prevail. But, this bill is directed toward the postwar construction program and there is no justification whatsoever for throttling the industry with such restrictive legislation during the period when the very future of our country depends upon the development and encouragement of free enterprise.

Though it is a purpose here to save the government money, past experience has amply demonstrated that in the final analysis any such procedure can only result in higher costs to the government and less efficient work.

Although highway building is the only type of construction specifically mentioned in the bill, it is not entirely clear whether it would apply to federal-aid highway projects. The exact terms refer to "all construction contracts entered into by any department, bureau or agency of the government." Federal-aid highway contracts are awarded by the states, and they would not be amenable to the proposed law. But it is reasonable to assume that the proposed procedure would soon be expanded to include all construction contracts financed in whole or part with federal funds, regardless of the awarding authority.

ARBA Opposed to H.R. 2030

The American Road Builders' Association takes the position that this proposed legislation is impractical, unsound and wholly unnecessary. It will not result in lowering construction costs nor will it eliminate so-called "unfair trade practices," whatever these may be. Conversely, the only possible effect of this ill-advised law will be the demoralization, if not the destruction, of an industry which, if given a chance, will play a most vital part in stimulating and maintaining a prosperous postwar economy.

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New York City to Get $60,000,000 Federal Aid

Agreement was reached Feb. 19 on terms of state legislation that will assure New York City $60,000,000 of the state's eventual $800,000,000 federal-state highway program.

The decision was made at a conference attended by N.Y.C. park commissioner Robert Moses, state superintendent of public works, Charles H. Sells and others. A bill carrying out the agreement was to be introduced in the legislature at once, and the terms will apply equally to all cities in the state. The basis is that the state, with federal aid, will pay the full cost of arterial highway construction within the cities and half the right of way costs. Plans and construction supervision to be the function of the state except where special cases might occur in New York City.

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Oregon: The highway commission will be able to let postwar contracts at rate of $2,000,000 per month, according to the commission's 16th biennial report, issued recently. Among other projects "ready" are 42 bridge structures to require $2,800,000. A new trans-Columbia river bridge is being studied jointly with the state of Washington.

Snatch Loading Speeds Output of Self-powered Scrapers

SNATCH loading gives the same results for self-powered scrapers as push loading—larger loads faster with less wear on tires—reports C. F. Zimmerman, general service manager of R. G. LeTourneau, Inc., in this firm's publication, "The Co-Operator." The company now recommends snatch tractors rather than pushers, when loading with an auxiliary tractor. Few contractors need to be told the economy of helper tractors on both tractor-drawn and self-powered scraper operations, but snatching 'em is still not seen every day.

The advantages of snatch loading become very apparent when loading loose sand. The pulling tractor not only supplies the added power for fast loading, but also keeps the scraper traveling in a straight line in event either wheel should spin in the loose sand.

These advantages of snatch loading also are realized in other types of soil. In addition, snatch loading minimizes the need for skillful operation of the scraper to keep it from jack-knifing when loading—an operation which can easily occur when pusher loading.

Many different types of pull hook arrangements are being used successfully, each having been designed and built by the individual user to meet his own needs. (Due partly to wartime conditions, LeTourneau does not as yet build snatch-loading equipment.)

Various Types—Same Principle

Although there are various types of pull hook arrangements in use, practically all of them employ the same basic principle.

Most of them make use of a beam, 10 to 15 ft. long, extending back from the drawbar of the snatch tractor, and having a loop or hook welded to the extreme end of the beam. The pull hook, as this arrangement is sometimes called, is raised and lowered by the power control unit, and is connected with the unit either by a direct cable or by a cable running through sheaves attached to a special "A" frame.

The pull hook is connected to the tractor drawbar by a universal forging assembly of the type used on the tongue of a tractor-drawn (Carryall) scraper. This allows free movement of the pull hook, to align itself with the hook on the front of the scraper during the forward movement of the scraper and tractor when loading. The cable extending from both sides of the tractor drawbar bracket and up under the roller on the pull hook, is attached to a cable leading from the power control unit. These cables are used to raise and lower the pull hook . . . also to stabilize it and prevent it from swinging back and forth and revolving at the universal forging assembly.

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Boston Plans $70,000,000 Super-Airport

Pacing the exciting competitive plans which larger American cities have launched to assure themselves a leading position in postwar aviation, state and city leaders at Boston have proposed a $70,000,000 field. Governor Tobin has called for its development now without waiting on Congress, as part of a state-wide plan

A 10-year stage construction program covering 2,000 acres is proposed. It involves starting with three 7,000-ft. runways and eventually providing three pairs of parallel runways 7,000, 8,000 and 10,000 ft. long; a huge paved terminal and auto park area; helicopter taxi area; seaplane base; shops, hangars, other buildings.

This field will represent an expansion of a project now in progress under which 1,800,000 cu. yd. of fill material per month is being placed by four dredges. One contract for 5,500,000 cu. yd. was completed in Nov.; another 13,000,000 cu. yd. is to be pumped in by summer, 1945. Work is under direction of the state Emergency Public Works Committee, as one of numerous postwar projects. Thompson & Lichter Co., engineers.

Massachusetts began the field on lease in 1928 after having spent $3,000,000 up to that time. Bonds for $2,000,000 were issued in 1941 and for $4,750,000 in 1943, thus bringing the financing to date to about ten million dollars. The second stage cost will be $12,900,000 including hangars.

As with all big airfields now being planned for civil aviation, design and construction of runways and other physical facilities is regarded as merely one phase of a management problem which is ultimately commercial and financial. Voluminous studies of passenger and traffic prospects have been made. Estimated $2,000,000 annual income from the completed airport is anticipated, with over 900,000 passenger and 2200 tons of cargo handled first postwar year in addition to transoceanic traffic.

Presaging the possible creation of state, regional or metropolitan airport agencies elsewhere over the country there is a proposal to put the Boston airport under a manager appointed by the governor upon nomination of a committee composed of representatives of the Boston C. of C., N. E. Council, Associated Industries, and Air Transport Assn. of America. This step would take the project out of the hands of the Mass. Dept. of Public Works division of waterways, which now controls the airport and the port of Boston.

One successful snatch arrangement, devised by A. I. Savin, contractor, of Hartford, Conn.

A.G.C. Holds Annual Meeting

Contractor leaders consider postwar markets, government surplus equipment sales, taxes, public relations, numerous industry committee problems

MARKING the fifth consecutive year in which membership has risen to a new high, the Associated General Contractors of America, Inc., held its 26th annual meeting in Chicago March 5-6, the governing board serving as a convention to comply with the wartime restriction on gatherings.

Harry A. Dick, Portland, Ore., president of Gilpin Construction Co., was installed as president, succeeding Wm. Muirhead; and Warren S. Bellows of W. S. Bellows Construction Co., Houston, Tex., became vice-president.

The group among other things: heard retiring President Muirhead and Managing Director H. E. Foreman summarize AGC's activities in a year of continued growth and progress on major contractor problems; considered tax, OPA, WPB, surplus property and other pressing matters.

Received committee reports on legislation, market development, public relations, accident prevention, and other subjects; gave lengthy attention to labor relations, which have grown to be one of AGC's chief activities.

Among the several resolutions or decisions the group:

1. Opposed OPA control of rental rates on commercial properties.
2. Opposed establishment of a Missouri Valley Authority, endorsing present agencies, Bureau of Reclamation, USED.
3. Approved accelerated depreciation of new commercial and industrial structures as a means of stimulating postwar business activity.
4. Endorsed increase to $75,000,000 of proposed $5,000,000 fund for postwar project planning now in Congress.
5. Recommended renewed vigor in efforts to stimulate advance planning.

Highlights of Managing Director Foreman's Report

Market Data: 1945 construction volume is estimated at $3,256,000,000 or $3,750,000,000, depending on 2-front war. 1944 volume was $3,940,000,000 (WPB report). Total war and civilian construction, July, 1940, through 1944: $52,000,000,000.

The association has continued to explore all legitimate possibilities for contract construction. AGC members in 1944 performed more non-construction work than construction (ship building, logging, mining, plant maintenance, etc.). Performance of more highway maintenance and repairs by contract has been urged, some of AGC's highway chapters having secured a substantial volume of such work.

Road contracts may accrue in 1945 from a $53,000,000 federal appropriation for access and strategic road construction now before Congress.

WPB Contact: Consultations have been held regularly with WPB officials. Last October a Construction Bureau was established in WPB (John L. Hayes, director) which has centralized industry control. Discussions have been held toward relaxation of restricting order L-41 after V-E day.

Equipment Situation: Ten AGC members are included in a WPB Used Construction Machinery Industry Committee recommended by the association. It has recommended that contractors be allowed to engage in the kind of work for which equipment in their possession is needed.

During the year a supplement to the well-known *Contractors' Equipment Ownership Expense* manual was published covering items not listed in the 1938 edition.

AGC has maintained contact with ODT on regulations governing operation of vehicles and equipment; and with the OPA on price regulations of sale and rental prices for construction equipment. It reaffirmed its position on the disposal of surplus equipment after the war and appointed a special committee on the problem. The association has urged that dumping be avoided, that equipment be sold at fair prices through established channels.

Possibly an industry advisory committee will be established with the Surplus Property Section of the Treasury Dept. As of Feb. 1 the Treasury had inventoried 16,000 units of used construction equipment, valued at $6,000,000. (Sales now being handled through regional Treasury Procurement offices are made first to dealers; contractors and other qualified consumers may purchase that not bought by dealers. Most of this equipment sold recently has been characterized as "junk.")

Improvement of Contract Conditions: A continuing activity of the AGC has been the study of contract forms and the conditions under which general contractors operate. One of its functions has been to seek correction of contract terms or conditions which are not fair and equitable to the contractor and the owner.

Last fall, as the result of association negotiations, FWA made revisions in Standard Form of Government Contract No. 23, when used for the construction of defense public works under the Lanham Act, to excuse delays caused by inability of the contractor or subcontractor to secure materials by reason of preference ratings issued by the government, or to obtain workmen, by reason of failure or inability of WMC to certify workers.

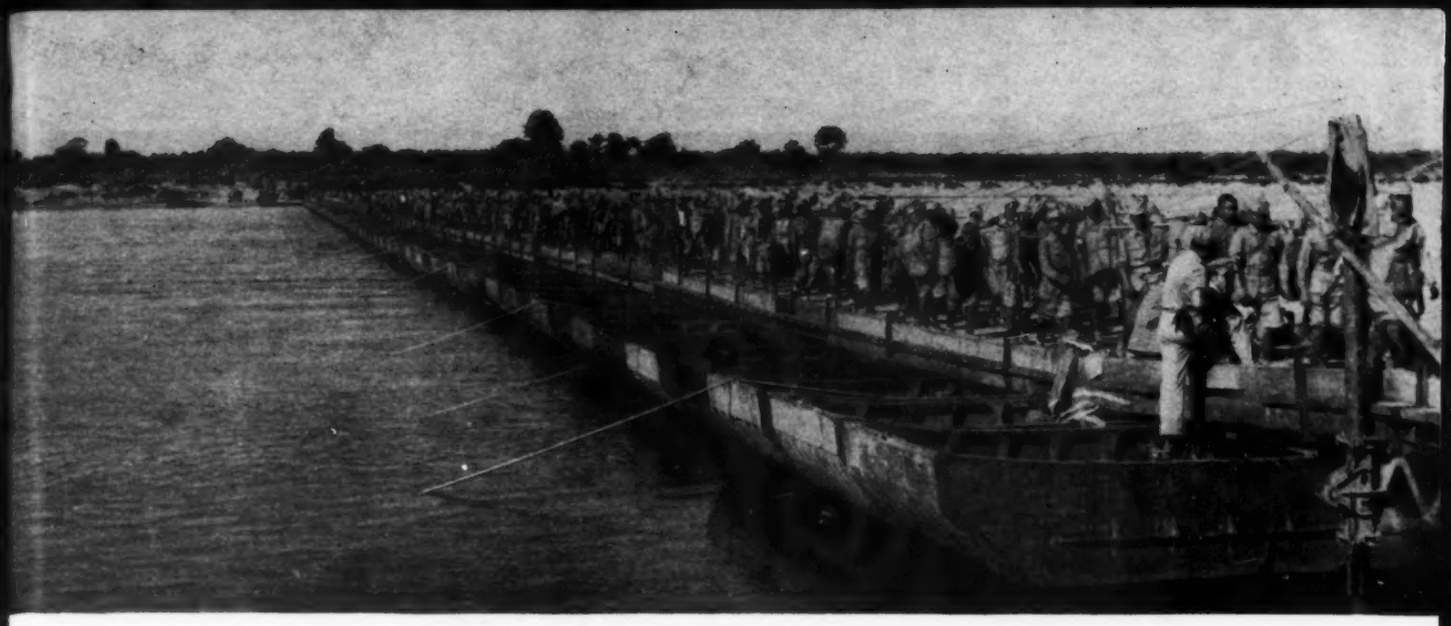
A protest filed by AGC on behalf of members against Revised Maximum Price Reg. 251, setting ceiling prices for construction operations, is pending before OPA.

Labor Relations: AGC activities now in 8th year. Each year the demands by members and chapters for information and assistance on all phases have more than doubled; labor work now greater than entire association work 15 years ago.

Activities fall into three classifications: relating to federal laws, regulations and administrative procedures; assistance in negotiations, bargaining or settlement of disputes with organized labor when requested by a member or chapter; and employee aid and protection. The Labor Relations Committee of which Past President E. P. Palmer is chairman, has been active in shaping policies. Requiring a great deal of attention are federal laws, wage stabilization and operations of the Wage Adjustment Board; payment of overtime on construction; employment controls, Selective Service regulations, deferment, reemployment of veterans, etc.; negotiations, dispute settlements, etc., with organized labor; disputes over government regulations or jurisdictional; employee aid and protection, insurance, hospitalization, etc.

Payment of overtime has remained complicated due to the overlapping of

(*Continued on page* 99)



Signal Corps Photo

LONGEST PONTON BRIDGE of this war is this 1200-ft. structure thrown across the Irrawoddy River to serve as a link in the Ledo Road and support the Allied push into Burma. Only 60 men were able to complete the bridge in less than 15 hours. Note Chinese troops. This bridge is said to have been exceeded in length by only two other ponton structures, one built in 1864 across the James River to help Gen. U. S. Grant's troops take Richmond, the other built in 1919 across the Rhine River by American Engineers

With U. S. Army Engineers Abroad

NEAR ZWEIFALL, Germany, last November, Engineers of U. S. Infantry Division constructing a corduroy road

Signal Corps Photo

Landing beach for LCT's, known as Area No. 1. Showing the unloading of half tracks by tractor tow. Le Havre, France

U. S. Army Signal Corps

The Beginning of the End . . . Hitler's generals knew they were licked when Allied fighting men and equipment really got rolling. One reason the blitzkrieg idea blew up in their faces is the miracle of Allied supply lines—aided by an armada of the mightiest cargo-carrying trucks any army ever had. Hundreds of these huge 10-ton, 6 x 4 Macks helped chase Rommel out of Africa. Many more hundreds of them rolled into France on the heels of D-Day fighting men. When you think of Mack's record these past 44 years, perhaps it's not surprising that big *Macks* were the trucks for this big job. And it's not at all surprising that they did the job so well. Anywhere and any time—Macks really get things done.

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TRUCKS

ONE TON TO FORTY-FIVE TONS; BUSES, FIRE APPARATUS AND MARINE ENGINES

BUY U. S. WAR BONDS

Tiling to Control Pumping Joints

By CARL E. VOGELGESANG
Engineer of Road Design,
Indiana State Highway Commission

DRAINAGE lines have been installed recently along existing concrete pavements on five of Indiana's more important roads where the effects of pumping under excessive wartime traffic were most noticeable. These jobs total over 90 miles and employed some 413,000 lin. feet of pipe.

Such installations have not entirely eliminated pumping, but have generally given satisfactory service by bringing a marked reduction in the intensity and duration of pumping.

The six projects involved include seven contracts on which the cost per lineal foot of drain ranged from 78 cents to $1.03, averaging 91 cents. Breaking the average cost into individual items gave the following:

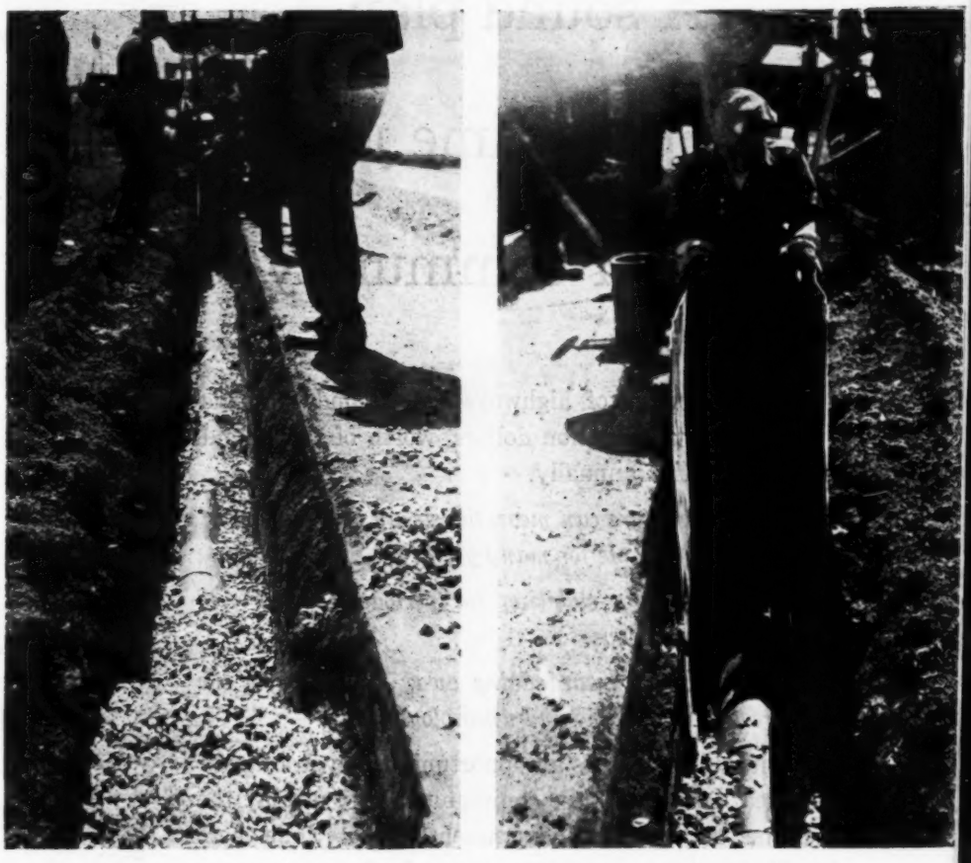
Drain tile along pavement edge	$0.53
Outlet drains	0.06
Granular backfill	0.25
Replacing sod above drains and any damaged sod	0.04
Signs, barricades and maintaining traffic	0.03
	$0.91

Experience at Intersections

On several inspections of U.S. 30, west of Valparaiso, special note is made of the condition of joints approaching road intersections, and those located within the intersections where the pipe drains had been omitted in order to avoid cutting the approach pavement. In each case the joints on either side of the intersection showed little or no signs of pumping, whereas the joints within the limits of the intersection showed continued pumping. It might also be added, that on each of the dual lane highways the drains were placed only along the outside edge of the pavement lanes. This proved sufficient since there is very little pumping taking place on inside passing lanes, which carry very little of the heavy truck traffic.

Under-Pavement Slurry Clogs Drains

In a few cases where the pavement has continued to pump after the installation of drains, we have found that the slurry formed at the base of the crack or joint has filtered into the sand backfill of the drain, causing it to become sealed and thus ending its effectiveness. In such cases it has been necessary to remove the upper portion of the backfill material adjacent to the joint or crack, and replace it with clean sand. Most of these conditions were found on S.R. 67 between Albany and Portland, particularly where the existing pavement had completely failed, leaving loose slabs which would rock under impact. The contract here provided for replacing the slab and reconditioning the subgrade at such locations; however, unforeseen delays necessitated withholding patching of pavement until 1945.



Typical details of edge drain. Note how granular material is first compacted around pipe, then the next layer of material placed. Right view shows ditch-shaping shoe attached to trencher

Construction Methods Well Standardized

The general methods of construction on these projects may be briefly outlined as follows:

1) Mechanical ditching machines are used by all contractors to excavate trench.

2) 12-in. sections of drain tile are stood on end near edge of pavement, and placed in trench by workmen standing on ditch-shaping shoe attached to digger. Before placement of pipe it is generally necessary to do a slight amount of crumbing to remove droppings from trenching operations.

3) Most contractors place granular backfill material in a windrow near the edge of pavement, from which position it is bladed into the trench. A few contractors placed the granular backfill into the trench directly from trucks by means of gravity or mechanically operated hoppers attached to rear of truck.

4) Since the upper portion of the granular backfill material consists of sand, we have generally found it impractical to compact until the earth portion of the backfill has been placed. After the earth portion of the backfill is made, the backfilled area is compacted by running the dual wheels of a loaded truck or the wheels of a grader over the area.

5) The final operation consists of placing sod over the disturbed area including any damaged portions beyond the actual construction limits.

▼

FWA May Pay 50% for Toll Bridge—A bill has been introduced in Congress authorizing the Federal Works Administration to pay 50 per cent of the value of any toll bridge which a state might make a free bridge.

A sound plan for peacetime jobs in your community

America's network of highways and secondary roads is in need of three billion dollars' worth of repair and new construction annually.

- *This expenditure can mean the steady employment of millions of people for many years.*
- *It can act as a stabilizer for periods when private construction drops.*
- *It can go far toward doing away entirely with the threat of relief work and unemployment.*

This situation presents an opportunity for you to be of very real service to your community. Why not lay the facts before your local government — *now*, while there is still time for sound postwar planning?

And remember this: The use of Tarvia in the building of needed miles of secondary and feeder roads in your community will mean the employment of *local* materials, supplied and applied by *local* labor. That can mean a lot of jobs for a lot of folks in your community, when jobs may be needed.

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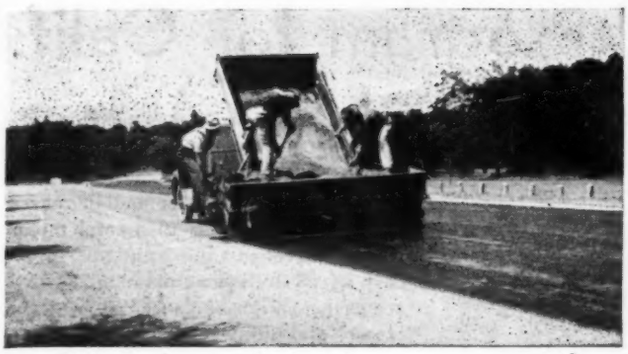

Putting down the first of two bituminous "shot" treatments on a park drive in Fort Worth. The Street Department does this work for the Park District

Double "Shot Course" for Gravel Streets

By H. H. HESTER
Street Superintendent
City of Fort Worth, Texas

THE city of Fort Worth has had its share of wartime population and traffic growth, and a bit more. And along with it has come a sharp increase in street maintenance cost. Outlying gravel streets in particular have needed constant attention, and the city is currently engaged in a large-scale bituminous treatment program as a means of reducing labor-consuming maintenance and repairs on such streets.

The usual prescription is a double "shot course" treatment. The street is scarified, reshaped, and rolled, some additional material usually being added. After a period in which traffic is allowed to "shake down" and compact the street, it is further touched up, bladed to true cross-section and rolled. Then the first "shot" is applied, consisting of 0.4 gal. of 100 pen. hot asphalt, followed immediately with No. 1 pea gravel spread one cu. yd. to 70 sq. yd. of surface and thoroughly rolled.

The second rolled course consists of a 0.35-gal. distributor application and No. 2 pea gravel, one cu. yd. to 90 sq. yd. Total combined mat thickness is about ½ in.

V. Z. Lancaster, Project Superintendent, and H. H. Hester, Street Superintendent, Fort Worth, Texas

The success of this formula under Fort Worth's hot, relatively dry climatic conditions is shown by streets which have given good service for 18 or 20 years.

The double treatment is being charged to property owners at rate of 25 cents per front foot or $12.50 per lot along 30-ft. streets. This charge, which actually covers only the treatment and not the scarifying, reshaping and preparation of the old street, gives property owners a bargain and they have responded readily. The 1944 program covering about 385,000 sq. yd. includes several park drives.

In past years during hot dry summer months property owners have phoned in and clamored for an "oil on their streets" to lay dust. While road oil has laid dust it has proved too light to hold back chuckholes and it has been our policy to sell people whenever possible on the heavier asphalt treatment herein described.

We also plan to encourage curb construction along curbless gravel streets where bituminous treatment is anticipated, since curbs help keep water from getting under pavement edges. This idea appeals to property owners when it is also shown that curbs help keep storm gutter flow from running back over low front lawns.

While discussing our wartime street program it will be of interest to mention our problem of maintenance at bus stops. Particularly where heavy bus lines use lighter bituminous pavements we've had to take out the pavement at bus stops and put in something stronger. Usually this has consisted of a sledge stone base and a two course bituminous top.

The foregoing information supplied by H. H. Hester, Street Superintendent. W. O. Jones is Director, Department of Public Works. S. H. Bothwell is City Manager.

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(*Continued from page* 94)

authority granted by the OPM-AFL Agreement, Executive Order 9240, WAB pronouncements on determinations of the Secretary of Labor, Executive Order 9301, the federal eight-hour-a-day law, and the Wage and Hour law. This overlapping has caused more disturbed relations, uncertainty and confusion than any federal regulation in construction. The AGC constantly has sought clarification. The history is so involved that it is doubtful if a clear-cut substitute can be made without a special law. The association has sent out 10 bulletins to chapters and members on this subject alone in the past two years.

Highway Construction: Said Director Foreman, "No field of construction is better prepared for the post-war period than highway construction. Federal funds already authorized, when matched by the states, will provide for the planning of a three-billion-dollar construction program.

Airport Construction: With a billion-dollar airport program before Congress, a special AGC airport committee is proposed to study legislation and advise on policy. Much airport work before the war was done by WPA; general contractors have a direct interest in future airport construction programs.

Safety Awards

Winners of awards in the 1944 accident prevention contests sponsored by the AGC were announced as follows:

In the Heavy Construction Division, Newberry Electric Corporation, Los

(*Continued on page* 110)

Post-War State Road Program for Calif.

A statement on recommendations of the California Major Highway Development Committee

FOR the past year a study of postwar highway needs for California has been conducted by a statewide committee known as the California Major Highway Development Committee, consisting of three representatives each from the State Chamber of Commerce, League of California Cities, State Supervisors' Association, Automobile Club, and Calif. State Automobile Assn.

Findings from that study, endorsed by directors of these groups, are as follows:

1. That a system of limited access urban-rural highways be established in California.

2. That there be created a special Limited Access Highway Fund for exclusive expenditure upon this system, and that there be added a special fuel tax of 1½c per gallon for this fund, in addition to a portion of federal and regular state highway funds.

3. That expenditures from the Limited Access Highway Fund be made in each county of the state in ratio of its motor vehicle registration.

4. That responsibility for the acquisition, construction, maintenance and administration of the Limited Access System be vested in the State Department of Public Works.

This new system of modern highways would embrace some 2,700 miles of interstate routes, consisting of two main north-south routes and five eastward laterals.

In addition to the Limited Access Highways, some 600 miles of metropolitan freeways have been approved for the seven metropolitan districts of California (1940 census reports), allocated as follows:

Fresno	17.55 miles
Los Angeles	282.54 miles
Sacramento	42.99 miles
San Diego	52.41 miles
San Francisco-Oakland	156.51 miles
San Jose	24.99 miles
Stockton	23.01 miles

California Planning for Big Future

The proposed system will carry probably 75 to 80% of the state's rural traffic volume and a substantial percentage of all city street traffic. Thus, the engineering safeguards against accidents which will be built into this system will provide added safety to the majority of the motorists of California and will give increased protection to all drivers who today must travel on highways which have a high accident frequency.

Those who have devoted the past year to the study of this subject agree that this program is sufficiently needed to justify the proposed increase in the Motor Vehicle Fuel Tax of 1½c per gallon. If the program is desired, it must be financed, and the proposal is believed to be the fairest and soundest of all methods studied.

California, now third state in population, will undoubtedly continue to grow and by 1955 we may reasonably expect five million motor vehicles registered. Unless steps are taken now to provide adequate traffic facilities, we will be faced with a complete breakdown of highway transportation in California. If we are to meet California's future traffic requirements, we must anticipate and prepare now for the development of a system of highways which will adequately handle this heavy concentration of traffic and which will serve both rural and metropolitan areas.

New Design Standards Needed

This will require a new policy of alignment and design for major streets and highways, particularly in population centers. Urban-rural freeways and limited access highways are the answer—the heavy traffic express arteries of the future. Their advantages assure constantly increasing use and, consequently, steadily increasing values to all highway users. Such highways, free of lateral interference and conflicting cross traffic, will provide the maximum in speedy, safe, and efficient highway travel.

It is generally agreed that this type of highway is bound to come, sooner or later. If it is intelligently planned and arrangements made for its financing now, it will certainly cost less than if it is delayed until some future time when the very chaotic condition of traffic forces this type of improvement upon the people.

Another factor which played an important part in the Committee's considerations was the necessity of building additional safety engineering features into our highway system. Traffic accidents have long been recognized as among the most serious social problems in America. By building into a highway system adequate engineering safeguards, much can be done to eliminate the possibility of conflicts in traffic and consequent accident hazards.

By the close of 1943, the number of automobiles and trucks had increased to 2,944,572. During 1943 total motor vehicle travel in California was in excess of 25 billion vehicle miles, 75% occurring on not to exceed 10% of the streets and highways, thus concentrating the major part of all traffic on certain main arterials and within well defined metropolitan districts. This has resulted in creating acute problems of traffic congestion and a general disrupting of land values and land use.

California, perhaps more than any other state in the nation, is confronted with the problem of developing adequate street and highway facilities to meet the impact of future motor vehicle transportation needs.

Even before the war overtook us there has already developed a grave deficiency in our highway and street facilities as a result of the over-all traffic these streets and highways were carrying, the character of the traffic, and the growing importance of highway transportation in our social and economic life.

Testimony by Mr. C. H. Purcell, Director of the Department of Public Works, showed that the state system has steadily fallen behind traffic demands for ten years; the war has only made a bad situation considerably worse. Aided by the moratorium on road building, war traffic has been causing substantial deterioration in highways and streets that were deficient to begin with.

In addition to the need for making up the pre-war defects and catching up on suspended construction and reduced maintenance, *we are faced with the gigantic problem of creating a modern highway system that will serve the highway transportation of the future* which, it is generally agreed, will greatly exceed in vehicle miles anything we have known heretofore. This building for the future must be done with due regard to efficiency and safety.

▼

Yale Traffic Bureau Renamed—The Bureau of Highway Traffic is the new name for the Bureau of Street Traffic Research of Yale University. This has been done to indicate the wide scope of operation of this organization because it is not restricted to research alone or to the field of street traffic alone.

Equipment Maintenance

Good Shop System Paid Off

. . . in this county last winter where 57 heavy snow trucks staged a 10-week battle and 36 mechanics "kept the barn from getting too crowded"

THE two equipment shops of Onondaga County, N. Y., weren't exactly quiet places during the Dec.-Jan. emergency. In spite of the fact that the shop men under superintendent Jesse Fellows had 30 of the county's 57 big snow trucks ship-shape and ready by Oct. 15, heavy and prolonged service put quite a few units back for repairs. They came in three or four every day during the worst of it. Much of the trouble was due to the inexperienced operators pressed into service to relieve or supplement the good men.

This county's experience is that the best snow crew can plow 3 to 10 times as much road as a mediocre crew, and the ability to avoid mechanical trouble by proper handling is a key factor. The man operating the wings must team with the driver like a mental siamese twin. Some "good" truck drivers simply don't have what it takes to develop into a good plow operator.

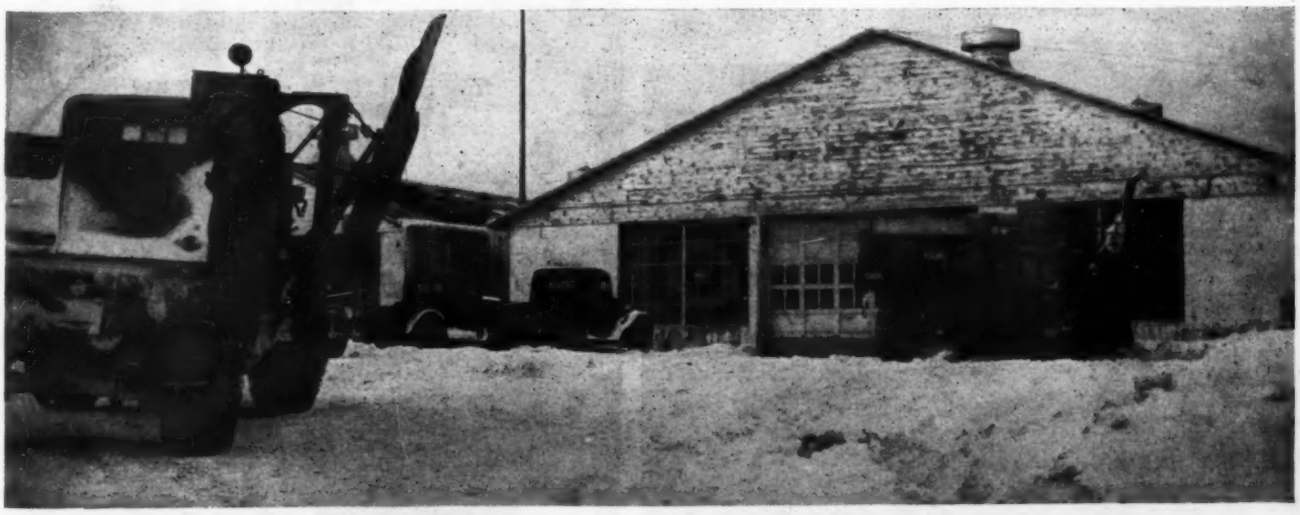
Keep 'em plenty loose, is the rule on chains. Tight chains chew up tires. About like this is right, say the Onondaga shop men

The county has an exceptionally good system of shop management and it paid dividends last winter. The plant at Jamesville is the main shop, containing the principal stock rooms and largest repair shop. The plows, as they return, are serviced here with gas and oil and then put into the garage by the hostlers. The drivers and operators are required, when they step off their trucks, to make a report on the condition of the unit, in triplicate, on regular forms provided for the purpose. One of the accompanying photographs shows the clerk entering repair records on the hooks on the shop wall. One copy goes to the shop superintendent and the third copy is attached to the truck.

Daily Trouble Report

The mechanics then take over and the repairs are made and the trouble report signed by their foreman. At the same time, he must state what was actually done on the truck and by whom. Some repairs cannot be completed before the next morning. All such trucks are listed on the assignment board in the shop office so the superintendent in charge of snow control may re-adjust the plowing schedule for the next day.

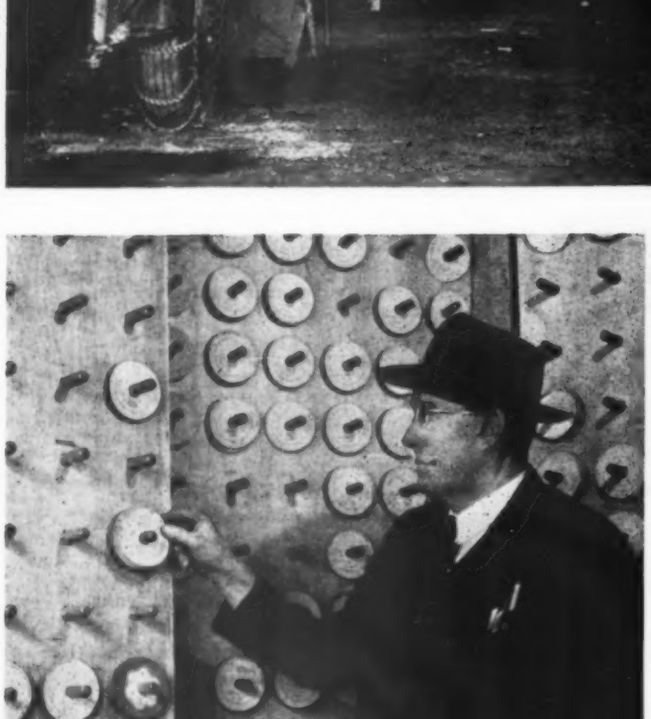
In spite of personnel losses a crew of 18 truck mechanics and 18 hydraulic equipment and plow mechanics were kept on the job. For days on end these men stayed through until 9 p. m.

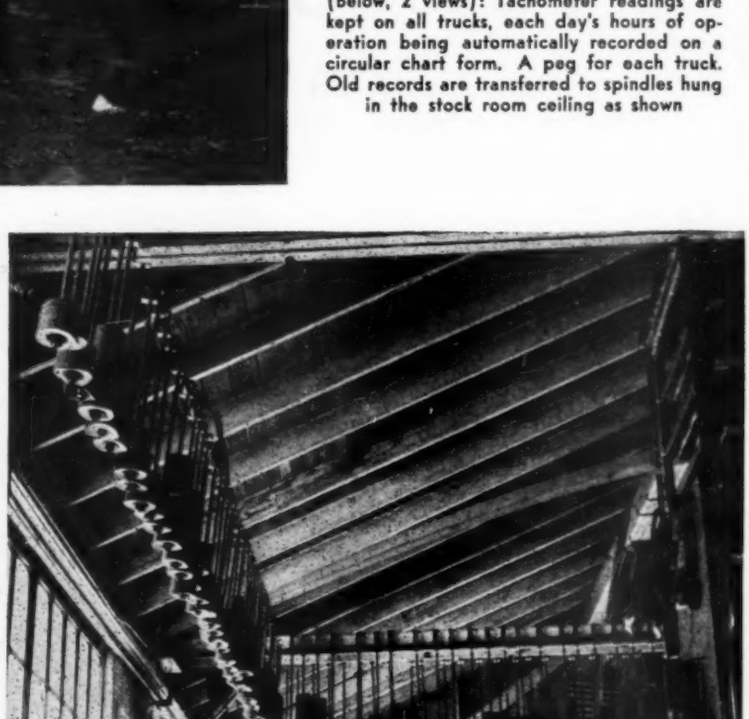


Home of one of the nation's largest county-owned fleets of heavy-duty snow trucks. Onondaga County's main shop at Jamesville, N. Y.

In the main shop room, where trucks are checked over and motor repairs made. A well-drained concrete floor is an important shop detail in handling snow equipment. If the floor lacks plenty of slope it quickly becomes sloppy from melting ice and snow

(Below, 2 views): Tachometer readings are kept on all trucks, each day's hours of operation being automatically recorded on a circular chart form. A peg for each truck. Old records are transferred to spindles hung in the stock room ceiling as shown





(Right): Chains, wholesale! Over 10,000 feet of cross link chain used annually to keep Onondaga County's fleet operating. Power equipment speeds cross link replacement

(Below): Where does operator team Smith-Jones work tomorrow? What extra men are out on plows? What trucks are out of order? The shop office blackboard always has the answers

or even midnight to get all trucks serviced and breakdowns fixed for the next day.

The "PM" system in force consisted of every available man jumping on a machine when it came in, checking lights, windshield wiper, brakes, battery, etc. Four service pick-ups were out all the time when plows were working.

The shop includes in addition to a motor line a section devoted entirely to checking, servicing and repairing hydraulic controls and handling plow attachment details, a carpenter shop with hand saw, a modern battery room, a tire chain bench, and such machine shop equipment as is necessary for performing simpler types of salvage and repair work.

This isn't a "fancy" place, with all the latest gadgets, but certain facilities help knock out a lot of work. Along the hydraulic control benches, where plows and wings are constantly being tinkered with, labor and time are saved by conveniently located chain hoists, a portable pick-up unit and a press. Breakage of hydraulic oil pipes, buckling of frames and shearing of plow bracket bolts are the chief troubles in plow operation.

Batteries and Chains Are Big Business

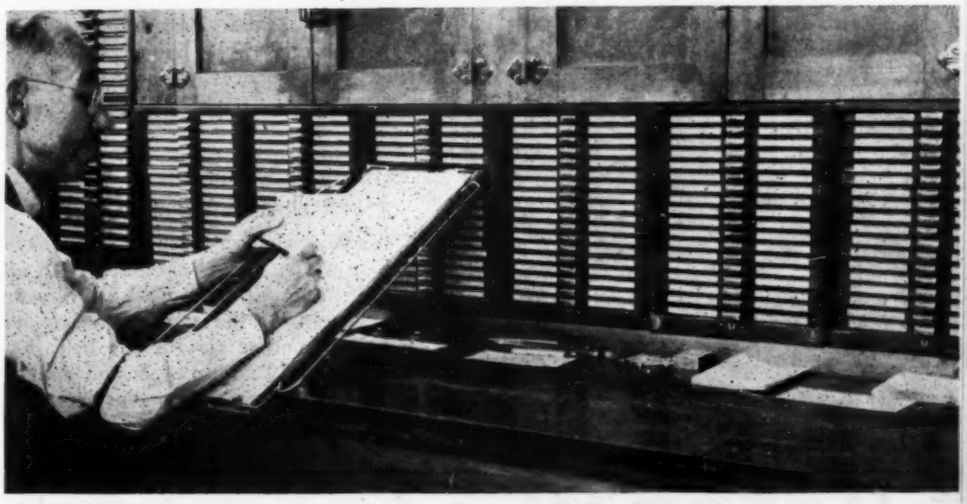
Batteries are big business here, in view of the fact that the county owns 104 cars and trucks of all types in addition to 25 other motorized units. The shop has built many of its batteries, although an order is now in for 36 factory-made batteries. Our 150 batteries are carried in service or stock, and 200 to 300 are built or rebuilt in a year's time. Rough handling of snow trucks causes high breakage, but not as much damage as carelessness in watching water level or generator speeds, according to Superintendent Fellows. "Watch plates and keep them covered, and watch your generator," is his constant admonition. Batteries for snow trucks weigh 165 lb. and are heavy to handle and hard to bolt down.

Chain cross links are ordered wholesale and it has been necessary to impress government officials with the utter indispensability of tire chains in snow clearance. The county buys about 10,000 linear feet of cross-link chain per year. Power bench equipment for opening and closing links speeds the work of replacing worn links. This chore keeps one man busy a good part of the time in winter.

Features of Onondaga County's Jamesville shop are two 30-ton-capacity hydraulic hoists which raise the big snow trucks—plow, wings, ballast and all—for periodic greasing and oil change. Each hoist, in use for three years now, is of triple-shaft construction, front and back. In conjunction is a modern pressure greasing system which delivers up to 6,600 lb. pressure on the gun—enough to "blow the fittings right out." Automatic air pumps are provided which fit over the heads of the grease drums, and two grease guns are designed with swivel-type

One of the big racks in the country's well-stocked parts depot

Each peg here is for daily "repair need" report sheets for a particular truck or machine. This board is behind a sliding glass panel on the shop wall



Over 10,000 inventory items at the finger tip here. Each of the 125 file trays is devoted to related parts

30-ton hoist with a big truck up for greasing. Guns have 6,600 lb. pressure on them

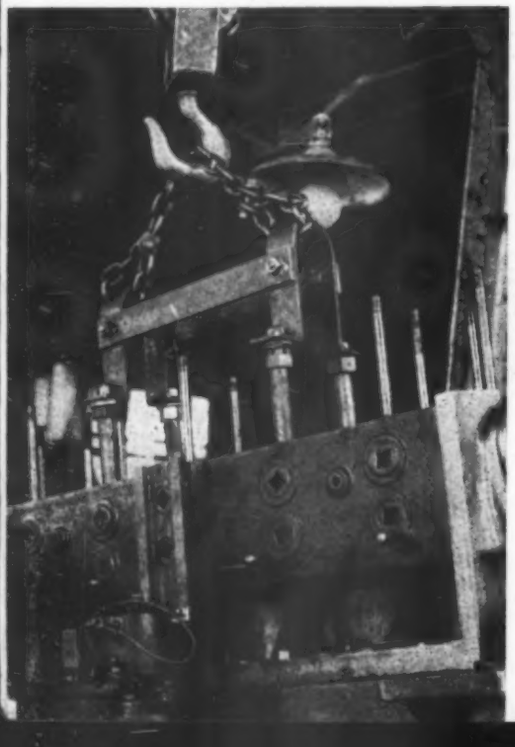
extension arms located high up in the shop ceiling, for working on greasing points in hydraulic wing controls and elsewhere over the hoisted trucks.

The county department designed its stock room around its special needs, and, having ample bin and shelf space, set out to accumulate an unusually complete stock of parts and supplies. This foresight has stood the county in good stead. A perpetual inventory system is maintained by a clerk who has in one compact cabinet 125 file trays listing the history and status of some 10,000 stock items.

Woop! One of several tires ruined by operators of rented equipment, in act of pushing other trucks out of difficulty during storms. Onondaga County got emergency release of badly needed truck tires in January

Handy Lifting Frame Permits Tipping Motor at Angle

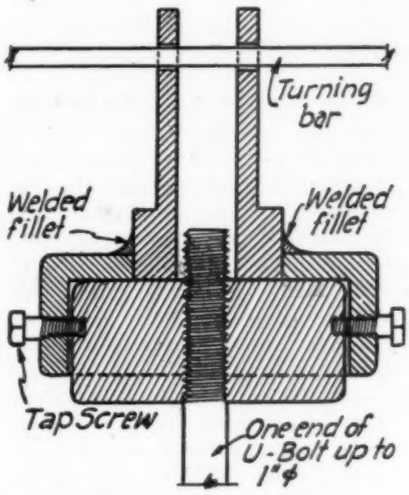
WHEN a truck motor is set back into place after being taken out on the bench for repairs, there's sometimes a bit of trouble in tilting the motor at the desired angle for handling and setting. In fact the whole business of picking up an engine block and setting it down is often quite an awkward chore. Lester Hill in the East Aurora district garage, Erie County, N. Y., highway department, solved his motor hoisting problem by fashioning the frame shown. Designed for a motor common to the county's snow fleet, it consists of a pair of strap steel arches bolted together as shown with the aid of a set of four sleeves. The frame is anchored to four engine bolts. The lifting hook and the chain cradle the engine so that it can be swung or tipped as desired. Arthur J. Yaw is supt. of highways; Lester Freeman, dist. maintenance engineer of Erie County.



A handy device and one which permits tipping motor as desired, promotes safety, and avoids the laborious job of fixing a rope sling for hoisting a motor.

Extension Shank for Die Helps Hard Thread Spring U-Bolts

It's easy enough to put an ordinary bolt in a vise and re-thread it with a plumber's stock and die. But when you try to do the same thing on a U-bolt the other side of the bolt interferes. Why not an extension sleeve on the stock frame? So reasoned the East Aurora shop men of the Erie County (N. Y.) highway department, whereupon they took a piece of alloy shafting and turned the sleeve job shown in the photo and sketch. Two holes, in opposite side, are threaded for tap screws which hold the threading die secure.



(Above and below): This extension sleeve puts the turning arm in the clear when threading the two ends of large U-bolts.

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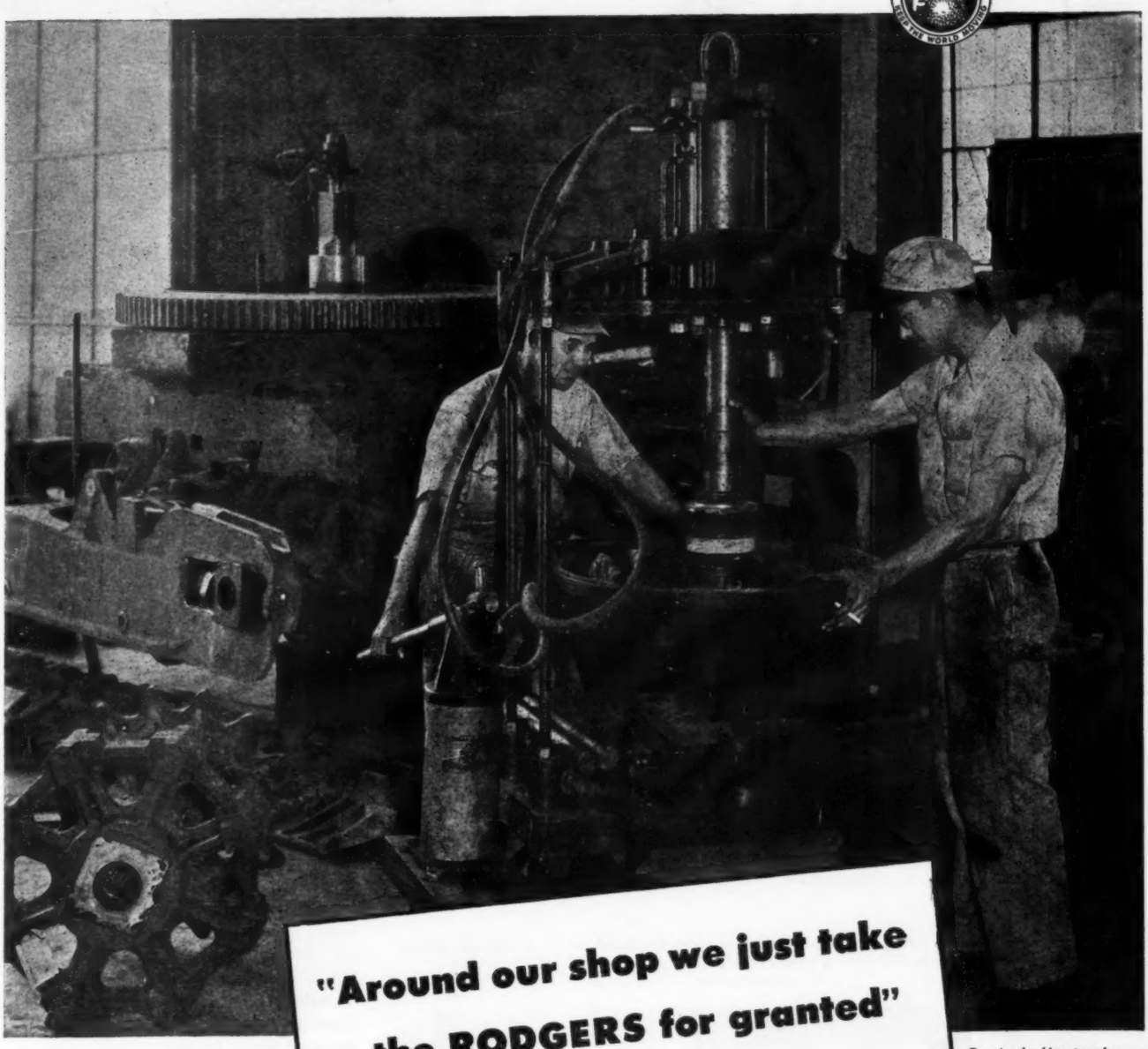

"Around our shop we just take the RODGERS for granted"

Pressing bushing into drum—photo courtesy Choctaw, Inc., Memphis

"For five years now our Rodgers Universal Press has been proving that it has the stuff. We've strained this unit to the extreme, away beyond its intended capacity. It's so adaptable that we've even used it in production welding, when the job called for pressure on a jig. We'd be lost without it."

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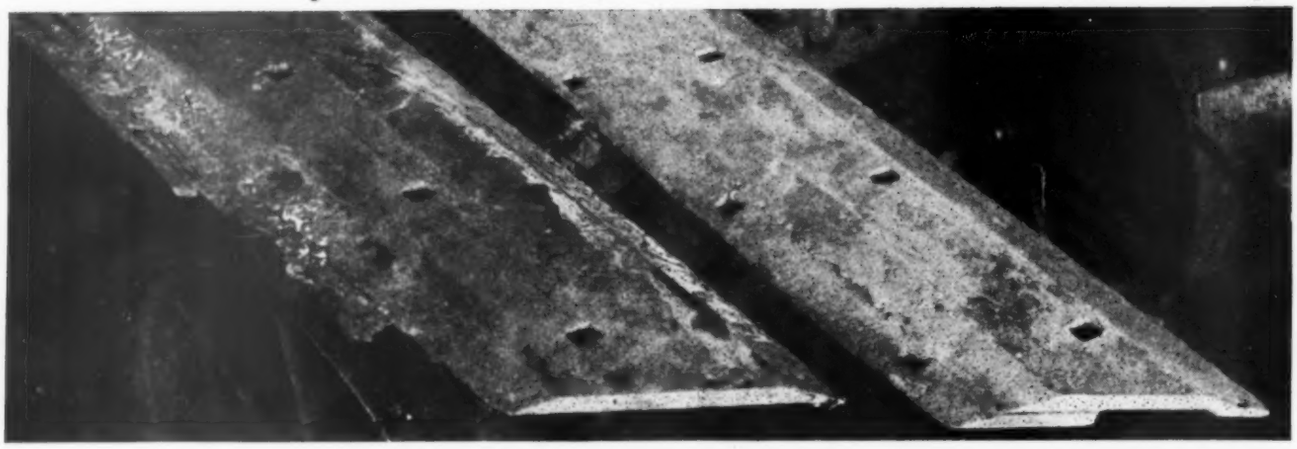


These two blades tell the story. Untreated blade at left curled as it wore down, impairing plow efficiency. Treated blade at right kept a straight edge throughout its life

Plow Blade Life Increased by Acetylene Flame Hardening

How New Hampshire state highway department saved 65 tons of blade steel last winter by welding worn blades to new and heat treating

By E. M. SAWYER
Supt. of Equip.
N. Hampshire State Highway Dept., Concord

LAST winter's deep snow took a lot of plowing in New Hampshire, and many tons of high carbon plow blades were worn out in the process. But the tonnage of blades required was only one-third to one-half that which would have been considered necessary in a comparable prewar year, thanks to a welding and flame hardening process in use at the state highway shop at Concord. Put into effect since the war as a means of saving metal and rendering the highway department less dependent, on priority steels, the method was used on some 1,500 new snow plow blades this past winter.

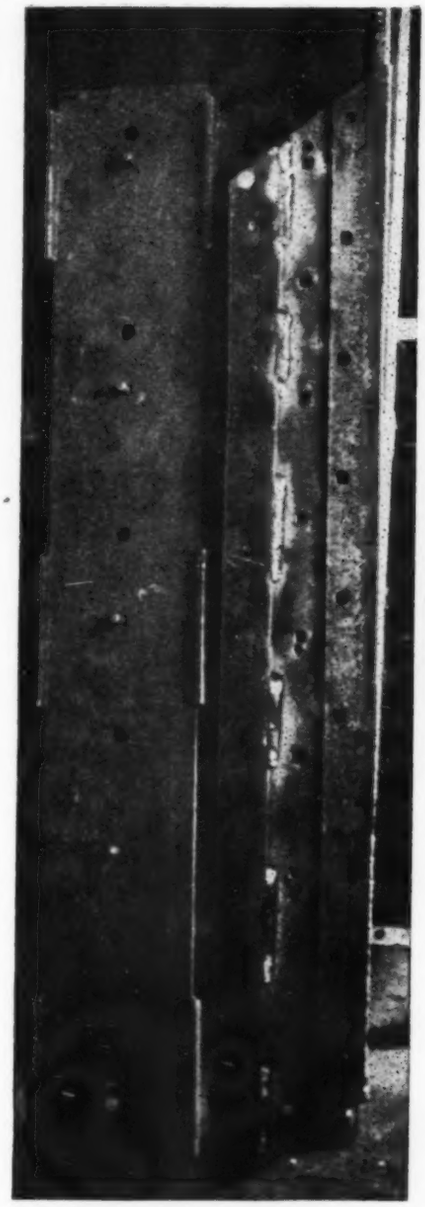
Flame hardening process being applied to a snow plow blade. A hood of special design directs the flame laterally over a considerable area of metal to avoid too high heat concentration

The first step is to weld worn blades against new, which is being done by most (though not all) highway and street authorities and is no longer news. The usual procedure of laying an intermittent bead along the lap edges is followed, and sometimes serviceable blades are made entirely from two or three split or whole sections of worn blades.

But the New Hampshire practice doesn't stop here. The cutting edge of the reinforced new blade is hardened and the blade's service-life increased two to tenfold by heating to 1400-1500 F°. with an acetylene-oxygen flame and quickly water quenching to about 400-600° F., after which the blade is allowed to cool to room temperature.

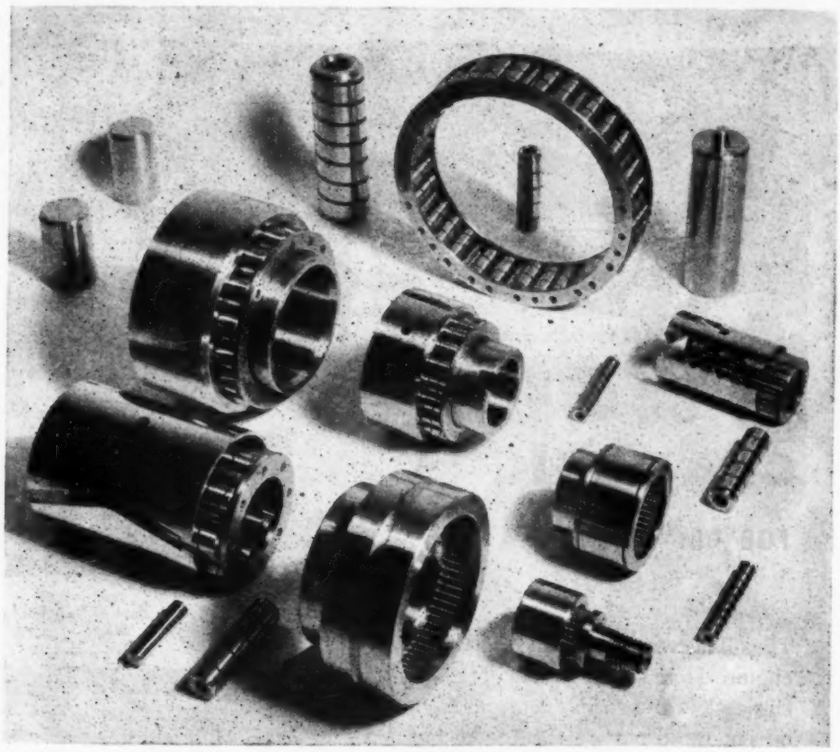
Tests have shown that 0.50 carbon steel treated in this manner develops a Brinnel hardness of around 480 or 490. Blades properly treated not only wear down more slowly but do so without any bending and curling of the blade edge as it wears down. As shown in the accompanying comparison photos, the hardened edge keeps a chisel-like beveled shape and therefore maximum plowing efficiency all the way down.

The process was a life saver dur-



Example of three worn blades lap-welded to form one new blade. At left is a template which is placed horizontally on sawhorses and is used to insure accurate width of lap-welded blades and properly spot bolt holes

RBC ROLLER BEARINGS



Help To Solve The Road Builder's Problem

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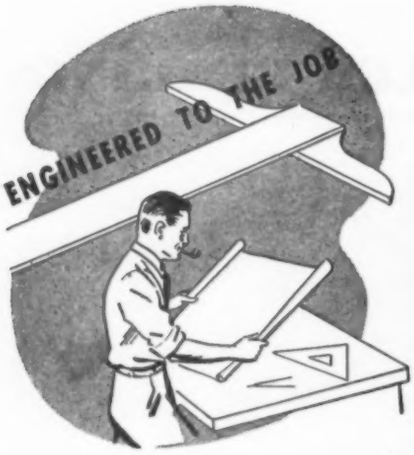
ROLLER BEARING CO. of AMERICA
TRENTON . . . . NEW JERSEY

In heat treating a blade it is first clamped in a horizontal position over a splash tank with cutting blade down, as shown in another photograph. The heat treating flame is applied through an acetylene torch, through a specially designed head which deflects the flame horizontally in either direction, thus spreading the heating effect over several inches of blade length. The heat is concentrated on about 2½ of blade width back from the edge, or about the width of wear before the blade is worn down to the plow apron.

The torch is mounted on an electrically-driven automatic traveling bed or jig converted from a horizontal cutting machine. The torch is thus made to travel at the rate of 8 to 9 in. per minute, a speed determined upon by experimentation.

Quenching is done from a fine nozzle also mounted on the bed and spaced one inch or about seven seconds of time behind the torch. It is important to leave some residual heat for the slow atmospheric cooling necessary to properly temper the blade. The timing and degree of quenching must be worked out by experience.

A properly hardened blade when cut through will look about as shown in the photographed cross-section. A triangular area of hardened metal is desired, tapering from a depth of about ⅜-in. or almost the full blade thickness at the cutting edge, to zero depth at a point 2½-in. in. Hence the torch must be carefully spotted to concentrate the heat toward the edge. Thus when the blade finally is worn down the unweldable heat-treated metal is all worn away and the remnant can be tacked onto a new blade with ordinary arc welding and the cycle repeated.



WGB CLAROFIERS

FOR BETTER LUBRICATION, LONGER

The oil lasts longer—and so does the engine. Here's the reason. The exclusive WGB cartridge removes from oil not most, but *all,* the enemies of engine-life—dirt, sludge, water, harmful acids, colloidal carbon. It is easily installed by hand, without tools, and replacements cost less than oil changes. Heavy-duty WGB Clarofiers, for all gas and Diesel engines, are rugged, simple in design and operation, and each model is specifically designed for the job it has to do. Bank on the proved reputation of WGB oil clarofying. It saves time, money, overhauls, oil, and irreplaceable engine parts.

Free book describing low-cost WGB oil clarofying—for gas and Diesel engines—is yours for the asking.

WGB

OIL CLARIFIER, INC.

KINGSTON, N. Y.

LET'S KEEP SEDIMENT OUT OF LUBRICATION

Before hardening new blades, worn blades are welded to them in accordance with standard procedure

N. H. Maintenance Engineer L. F. Johnson with equipment Superintendent E. M. Sawyer

ing the recent winter season, during which government approval was obtained for only 60 tons of the 85 tons of blade steel applied for. The flame hardening process, incidentally, is an economical one, costing only 25 to 30 cents a foot of blade, but whether it will be feasible to continue its use after the war is problematical at this time. F. D. Kenny is foreman of the highway shop. L. F. Johnson is maintenance engineer of the N. H. highway department, of which F. E. Everett is commissioner.

Cross-section cut from a treated ⅜-in. blade. Note "wedge" of hardened metal which extends almost through the blade at the cutting edge

Beware Unapproved Fluids for Hydraulic Brakes

Truck owners have been warned against the use of unapproved petroleum base brake fluids in the hydraulic braking systems of their vehicles.

Automotive engineers, in a statement released by the Automobile Manufacturers Association, pointed to the danger of brake failures and accidents if harmful oils are used in the brake lines. It has been learned that large quantities of a special petroleum base

TRANSITS and LEVELS — **HEADQUARTERS FOR REPAIRS— *—any make—***

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalogue RS-13 of Engineering Instruments, Engineering Field Equipment and Drafting Room Supplies.

WARREN-KNIGHT CO.

Mfrs. of Sterling Transits & Levels

136 N. 12th St., Philadelphia 7, Pa.

WELLMAN
Williams BUCKETS

Longer Service... Less Maintenance

Welded construction makes the difference! Multiple Rope, Power Arm and Power Wheel and Dragline buckets, 3/8 to 16½ yd. capacities.

Send for Bulletin

THE WELLMAN ENGINEERING COMPANY
7003 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

JAHN HEAVY DUTY TRAILERS

. . . save time and money between jobs!

JAHN Heavy Duty Trailers are the answer to quick movement of heavy equipment from job to job assuring more profitable operation by reducing idle time. There's a full range of sizes with any wheel or axle combination. All models are easily and quickly convertible from full to semi-trailers. Whether your load weighs 5 or 100 tons you can move it safely and quickly on a Jahn Trailer.

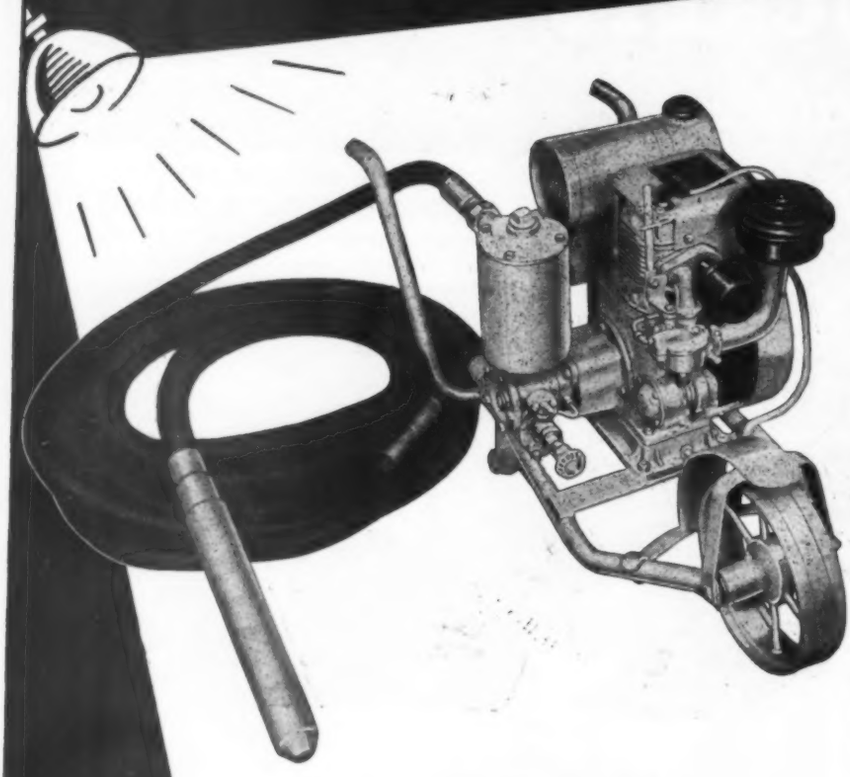
The new hydraulic brake application developed by Jahn engineers increases the safety on all loads because of smoother, faster braking action with positive, equal brake pressure on all wheels. Unlimited axle oscillation is permitted without affecting braking action There's no possibility of partial application or dragging of brakes when operating over rough terrain. Send for details.

JAHN Heavy Duty TRAILERS
Capacities from 5 to 100 TONS

"Come to Trailer Headquarters"

C. R. JAHN COMPANY
1345 WEST 37th PLACE • CHICAGO, ILLINOIS

for GENERAL CONCRETE CONSTRUCTION



JACKSON
HYDRAULIC CONCRETE VIBRATOR

Concrete grinder attachment quickly interchangeable with hydraulic vibrator head, for wet or dry rubbing. Easily converted into boring tool or drill with three jaw chuck.

For years, the most dependable and efficient, all-around internal vibrator for the general concrete contractor. Vibrator head size 2¾" x 21" — right for heavy duty and wide range of conditions. Adjustable frequency — 4000-7000 V.P.M. Correct amplitude and frequency. Continuous forced lubrication of all vibrator parts. Oil-powered, gas engine — hydraulic pump drive. Husky Wisconsin engine — 4.7 H.P. The leader in the famous Jackson Pioneer Line for years — the Jackson Hydraulic Vibrator is built to take it under severe, continuously operating working conditions, at lowest cost of maintenance.

THERE IS A RIGHT JACKSON CONCRETE VIBRATOR FOR EVERY JOB

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

brake fluid, designed for use only in military aircraft, have been offered for sale as surplus recently by the Government.

Swelling of the rubber cups in brake master cylinders and deterioration of the flexible hose lines can result in a few days if even a few drops of petroleum oil are used in the braking system, the engineers warned. They advised that careful cleaning and examination of the brake system, plus replacement of rubber parts, will be required in any instance where petroleum fluid has accidentally been used. The effects of the petroleum are to swell the rubber parts and make them spongy and weak, completely spoiling their effectiveness.

The safe types of automotive brake fluid usually have a castor oil base and this does not have a deteriorating effect on the rubber parts of the brake system.

The special petroleum base fluids for aviation equipment have proved satisfactory in airplanes because the brake hose and similar parts in aircraft are made of synthetic rubber which withstands the effects of oil.

▼

(*Continued from page* 99)

Angeles, Calif., won the trophy. Runners-up were The Fluor Corporation, Ltd., Los Angeles, Calif., and McAtee & Heathe, Spokane, Calif.

In the Highway Construction Division, A. J. Bales, Inc., Norwalk, O., won the trophy. Thorpe Construction Co., Akron, O., and Bellefontaine Development Co., Bellefontaine, O., were runners-up.

In New England contest, H. P. Cummings Construction Co., Ware, Mass., won the trophy. C. W. Blakeslee & Son, Inc., New Haven, Conn., and W. H. Ellis & Son Co., East Boston, Mass., were runners-up.

Awards to the AGC chapters having the highest percentage of members in contest went to:

Michigan Chapter AGC, Lansing, Mich., Henry A. Reniger, president.

Pennsylvania Branch Builders Chapter AGC, Wilkes-Barre, Pa., L. Verne Lacy, president.

Associated Building Contractors of Toledo, O., A. L. Bentley, president.

▲

Illinois Road Traffic Increases—Traffic in rural primary highways of Illinois in the last three months of 1944 was about 5 per cent greater than in the corresponding period for 1943. However, it was 40 per cent less than in 1941.

▼

11% Traffic Deaths Due to Poor *Brakes*—Records of fatal traffic accidents in 12 states show that unsafe brakes were responsible for up to 11 per cent of the deaths.

ADVANTAGES that pay dividends

1. Perfection Dump Bodies are made in a wide variety of styles and sizes, with accessories for all classes of dump truck service.
2. Shells are 10-gauge high-resistant sheet steel securely welded to understructure.
3. All parts are securely supported and braced by welded gussets to form practically a one-piece body.
4. Heavy duty hydraulic hoists that raise the bodies fast and smooth, with patented "cushion-drop" mechanism . . . double pusher arms prevent sway . . . hoists are mounted in sub-frames to give even distribution of load and simplify mounting.

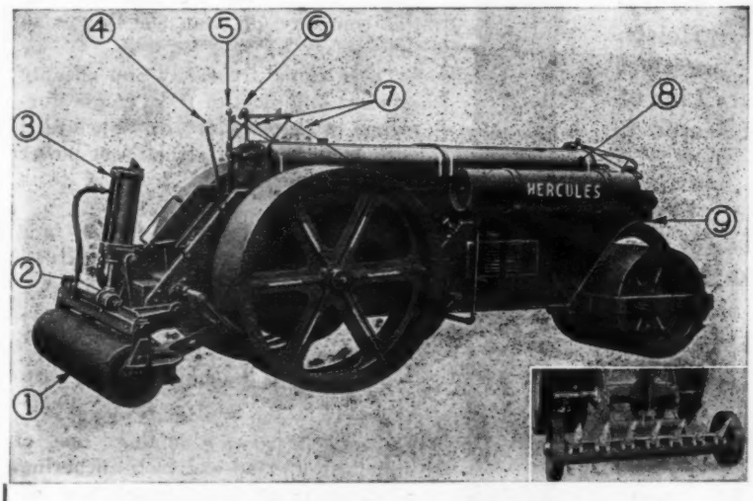
Write for bulletin and prices.

ARMY E NAVY — 4th CITATION FOR WAR PRODUCTION

THE PERFECTION STEEL BODY CO., Galion, Ohio

PERFECTION

TRUCK BODIES AND HOISTS



HERCULES ROLLER WITH *IRONEROLL* ATTACHMENT

HERCULES ROLLERS

and *IRONEROLLERS*

Combination of Tandem and 3-Wheel Types

For Base, Surface and Re-Surfacing

1. *IRONEROLL* Attachment—levels as it rolls
2. Automatic Equalizer prevents excessive compaction
3. Hydraulic Operating Cylinder
4. Reversing Lever
5. Operating Lever for *IRONEROLL*
6. Operating Lever for steering
7. Sprinkler Controls
8. Sprinkler Tanks (2)
9. Gyroscopic Yoke reduces weaving
10. (Insert) Heavy Duty Scarifier — interchangeable with *IRONEROLL*

When equipped with the *IRONEROLL* the 3-wheel roller becomes a highly improved tandem unit that smoothes to hump-free perfection. With the *IRONEROLL* there is less rolling — less expense.

Built by **HERCULES ROLLER COMPANY** Bucyrus, Ohio

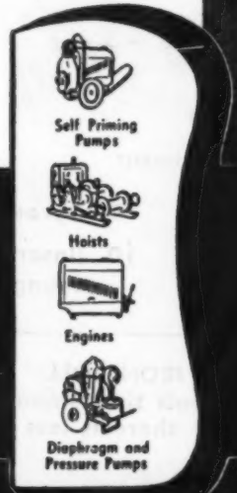
LOOK TO THE FUTURE

"The future belongs to those who prepare for it" is good advice in any business. Postwar Construction is figured in the BILLIONS! It is BIG BUSINESS and it needs BIG PLANNING!

Your *future* in the Construction Field depends on your *present* preparation. You'll need money-saving Equipment for money-making jobs! Novo Engine, Pumps, Hoists, and Generator-Sets have proven themselves by past performance. Novo's future Line of Construction Equipment will be geared to the postwar jobs!

To be a successful Contractor, LOOK TO THE FUTURE . . . for successful Construction Equipment, LOOK TO NOVO!

Associate Member of A.E.D.



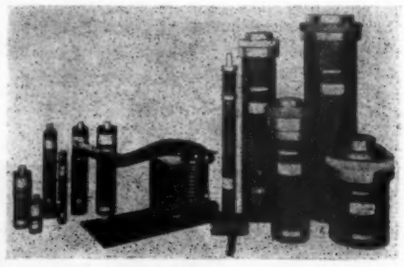
NOVO ENGINE CO.

New Equipment and Materials

Reimuller Hy-Speed Hydraulic Rams

The line of single acting rams illustrated is typical of the all steel aircraft style construction used thruout the general design of the Hy-Speed tools manufactured by Reimuller Brothers Co., of 9400 W. Belmont Ave., Franklin Park, Ill.

Using 4,200 psi as the basic pressure, a complete range of lightweight steel rams are available for assisting motivating or supplying force in many applications. Sizes available vary from ½ inch to 6-inch diameter. They



supply forces, if used with standard foot power units or motor driven pumps and valves manufactured by this company, of from 500 lbs. to 40 tons.

These rams are easily and cheaply serviced and most of them can be furnished with spring return. When used with 1 cu. inch per stroke foot power units, movements of from .1 to 4 inch result.

Further information, prices and engineer data may be had by addressing the manufacturer.

▼

New Self-Locking Pins

The Driv-Lok Pin Co., Chicago, Ill., has announced a complete line of standard and special self-anchoring, vibration-proof pins, which are designed to replace more expensive taper pins, keys, cotter pins, set screws, rivets, etc. These pins, which are pressed or driven into standard drilled holes, have four flutes on the surface parallel to the axis. The length and position of the flute can be controlled accurately, so that fully or partially grooved pins are available. Fully grooved pins have a pilot at one end so that the pin can be easily inserted. They are available in sizes from 3/64 in. to ½ in. diameter, and from 3/16 in. to 4½ in. in length, in any material, and in a wide variety of types.

BALANCED FLYWHEEL-FAN

another "PLUS FEATURE" IN ALL WISCONSIN Air-Cooled ENGINES

Every Wisconsin Air-Cooled Engine is equipped with a high-efficiency fan that is cast integrally with the flywheel. And each of these flywheel-fans is carefully balanced on a combination balancing and boring machine which accurately locates the heavy spots by means of gravity pendulum swing . . . and then takes out the excess metal, as required. Each unit is tested for smooth, free-running balance.

Just another production detail that removes a potential source of vibration and needless wear . . . *right at the source!* Isn't that the kind of an engine you want on your equipment?

Most H.P. per pound

WISCONSIN MOTOR Corporation

MILWAUKEE 14, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

THE DAY IS COMING

. . . when contractors and users of heavy construction equipment *will* be able to obtain delivery of new excavators.

When that day comes, Byers will be ready to offer their many customers and prospective customers a variety of newly engineered, tested and perfected postwar shovels and cranes, draglines and trench hoes that are powerful, fast and modern. These new models are now being used on war work, by war contractors and by the armed forces.

Never before have Byers new models had so extensive, thorough and prolonged a test period before being offered for general sale, thereby providing our engineers with data that results in improved products you will be eager to own and use.

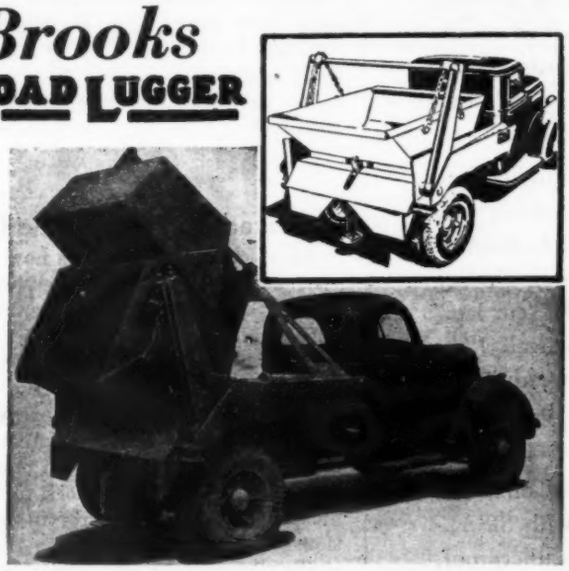
These new excavators will range in sizes from a low priced 3/8 yd. to the finest 1 yd. on the market. For further information, consult your nearby Byers distributor.

BYERS CRANES AND SHOVELS

RAVENNA, OHIO

DISTRIBUTORS THROUGHOUT THE WORLD

Brooks LOAD LUGGER



Municipalities can use these two types of the LOAD LUGGER with a big saving in time, manpower and equipment costs. Regular open-type dump bucket shown above and enclosed type container, below. Spotted at convenient points for loading, containers can be filled and picked up for hauling and dumping. *Write for Bulletin.*

503 Davenport Road, Knoxville 8, Tenn.

Distributors in All Principal Cities

Brooks EQUIPMENT & MFG. CO KNOXVILLE TENNESSEE

ETNYRE "Black-Topper"

BITUMINOUS DISTRIBUTORS

Etnyre Full Circulating Type Spray Bar gives *positive control* of all valves for *instant* start and cut-off of spray . . . for spraying from *any part of bar.* In either spraying or traveling position, material *circulates from end to end* of bar. Get details on this *tried and proven* Spray Bar from your Etnyre Dealer or write us.

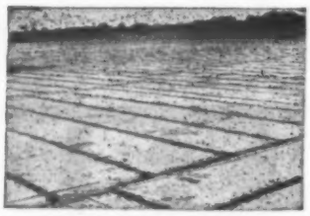
E. D. ETNYRE & CO., Oregon, Illinois

SISALKRAFT

BLANKETS
SAVE TIME, MANPOWER AND MONEY IN CURING!

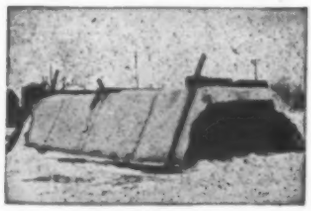
SISAL REENFORCEMENT GIVES STRENGTH AND TEAR RESISTANCE

LOW-COST PROTECTION On ALL Road Jobs!



PROTECTING SOIL CEMENT

PROTECTING ROAD MIX



PROTECTS MATERIALS STORED IN THE OPEN

UNMATCHED in their ability to hold moisture within the slab, SISALKRAFT Road Blankets have a time-proven record as the Number One concrete curing agent — producing denser, longer lasting concrete roads at low cost.

Savings in time, manpower and money are effected by the speed with which two men apply SISALKRAFT Blankets over the slab. No sprinkling — no burlap — just "let 'em lay." The concrete cures automatically! The slab is protected from weather and dirt! The blankets are used again and again.

Protect soil cement, road mix, materials and equipment with SISALKRAFT. It's tough, weatherproof, scuffproof, tear-resistant!

As vital war needs decrease, more and more SISALKRAFT will be available for your use. Victory comes first — and that's the way you want it, we're sure.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

New Transmission Belt Uses Steel Cables

Reputed to be one of the greatest advances in the last two decades in transmission belts, a new "Compass 250" transmission belt which utilizes steel cables instead of cord or fabric for the carcass, is announced by The Goodyear Tire & Rubber Company.

The steel cables are encased in an envelope of non-load carrying fabric. The cables consist of a special twisted, finely stranded, high-tensile wire. Half the cables in a belt are twisted to the left and the other half to the right to insure a neutralized, true-running belt. This construction is patented.

The best applications for "Compass 250" steel-cable transmission belts were described as "new drives which can be initially designed to take full advantage of its merits."

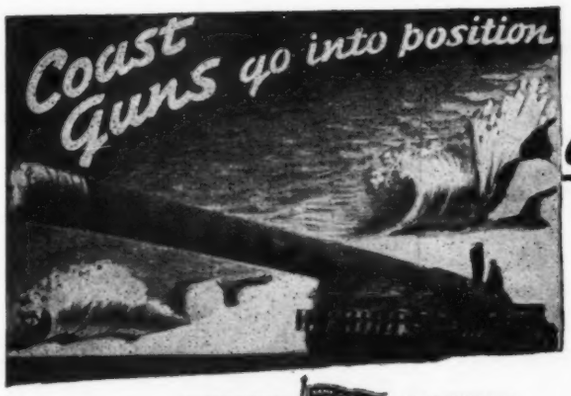
The belts are described as "practically unbreakable" and have "strength to spare even under terrific shock loads," because cables are imbedded in rubber and encased in a fabric envelope and thus "can receive no external, strength-reducing wear."

W. C. Winings, manager of Goodyear's Mechanical Goods Division, and Walter P. Hallstein, Jr., belt department, said the new belt was developed especially for postwar machinery and equipment. Other advantages include high heat resistance, shrinkage resistance, possibility of using narrower belts and pulley space. For further facts address this department at Akron, O.

▼

Improved Electric Blasting Caps

All electric blasting caps now being produced by E. I. du Pont de Nemours & Co., have two improvements—nylon-insulated wires and rubber plug closures. The wire covering of tough, abrasion-resistant nylon is the equal of enamel insulation in preventing current leakage. It is not affected by extreme or rapid changes in temperature and is in brilliant colors, minimizing the possibility of error in connections. In addition to reducing the possibility of misfires, the new wires are clean to handle and resist kinking. Formerly, blasting cap wires were covered with impregnated cotton. The rubber plug closures, double crimped in the shells, replace the combination of bridge plug, asphaltic water-proofing and sulfur seal, thus increasing resistance to water penetration. The new shells are much shorter than the old type without sacrificing explosive strength. Thus priming is made easier and safer.



EXPERIENCE *builds 'em* PERFORMANCE *sells 'em*

SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
ALBION,
PENNA.

DAVEY AUTO-AIR GETS MOBILITY, ARMY STYLE— INTO COMPRESSED-AIR JOBS

This war has taught America mobility . . . the value of self-contained units that can get to the job, do it, then get quickly on to another.

On short compressed-air jobs, where maximum mobility means greatest efficiency, the Davey truck-mounted AUTO-AIR has no competition. Powered by the truck engine through the Davey Heavy-Duty Truck Power Take-Off and mounted behind the cab, using less than one-third of the truck space, the Davey Auto-Air leaves plenty of room for men, tools, and materials.

MOBILITY — ECONOMY — VERSATILITY

A choice of three units—compressor, compressor-welder, or compressor-welder-lighting generator—offers ability to do almost any job. Compressors available in 60, 105, 160, 210 and 315 cu. ft. capacities . . . welding and lighting generators to suit your requirements.

For full information on the complete Davey Line of Compressors, Truck Power Take-Offs, Pneumatic Saws and additional pneumatic engineering data, write today for free catalog E-172.

D-505-B

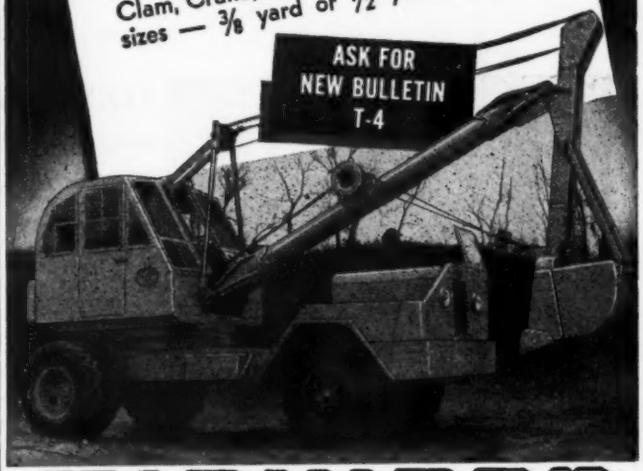
DAVEY *Compressor Co.*
KENT • OHIO

DEALERS IN PRINCIPAL CITIES

A TRENCH HOE ON WHEELS...

With a digging depth of eleven feet, the Michigan combines real trench hoe advantages with convertibility to Shovel, Clam, Crane, and Dragline. Made in two sizes — 3/8 yard or 1/2 yard capacity.

ASK FOR NEW BULLETIN T-4



MICHIGAN
POWER SHOVEL CO.
BENTON HARBOR, MICHIGAN

When in need of heavy machinery trailer information

——Write——

La Crosse Trailer & Equipment Company
LA CROSSE - - - WISCONSIN

Three semi trailers shipped recently to one of our southern dealers:

Left—DF6 18-semi.
Center—DF6T 18-semi.
Right—DF4 11-semi.

These are all very popular models.

Remember the name—

LA CROSSE

"GOOD MACHINES"

Good installation demands that joints be placed at exactly the 'right' moment—necessitating a rapid machine. Often joints are placed when the concrete is too 'wet' or too 'dry.' It is not necessary to float, matrix in low places, nor work concrete along joints when dry.

Machine installation of all kinds of contraction joints increases the value of roads by—better and more uniform installation.

FLEX-PLANE joint installing machines eliminate messy hand methods. Install all types of joints . . . ribbon, poured, premoulded, etc., with or without VIBRATION.

• *Ask for Equipment Specifications* •

FLEXIBLE ROAD JOINT MACHINE CO. WARREN, OHIO U. S. A.

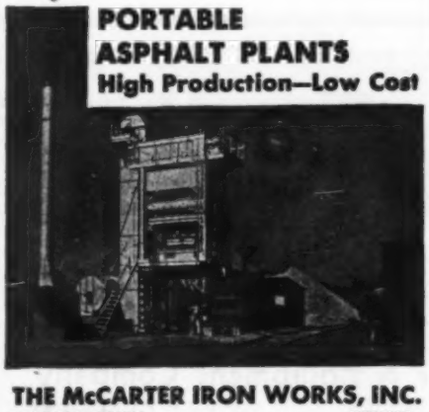
SAVE 50%
• on Fuel
• on Time

Aeroil Heet-Master
HEATS AND MELTS ASPHALT TWICE AS FAST

The ONLY insulated tube fired kettle with a completely removable heating unit (for quick and easy cleaning). The ONLY kettle with the burner INSIDE. Now available on pneumatics (and with mud guards too at slight extra cost) on high priority orders. Send for FREE Bulletin No. 280HR. For paving tools and accessories write for Leaflet No. 501RS.

AEROIL BURNER CO., INC.
WEST NEW YORK, N. J.
Chicago San Francisco Dallas

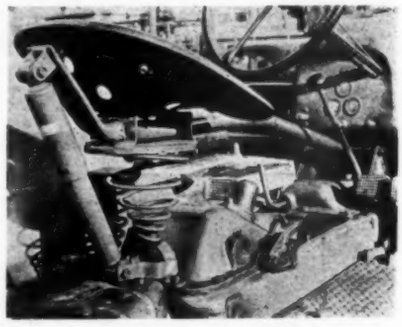
PORTABLE ASPHALT PLANTS
High Production—Low Cost



THE McCARTER IRON WORKS, INC.
NORRISTOWN, PENNA.

New Seat for Road Equipment

A new seat which provides greater comfort for operators of road building equipment has been developed by the Monroe Auto Equipment Co., Monroe, Mich. Three seats level off the ride of the occupant regardless of the jolts taken by the vehicle's chassis as it goes over rough ground. The seat



New Seat for Road Equipment

utilizes a special variable rate spring which reacts equally to large men or small boys. A double-action hydraulic shock absorber resists the down and up action of the spring, assuring a level ride regardless of the roughness of terrain. In addition, a stabilizer bar prevents side sway.

New Compressed Air Saw

A new air-driven power saw, weighing only 42 lbs., has been brought out by the Lombard Governor Corporation, Ashland, Mass. It is operated by a 3½ h.p. motor at 90 cu. ft. of air at 90 lb. pressure. Cutting capacity is 24 ins. A 5 h.p. 36-in. cutting blade is also available, as well as 24-in. and 36-in. electric models. Safety guard the full length of the top gives positive protection when the saw is in operation. An entirely new interlocking chain construction assures maximum service. Strong links, easier link replacement and faster cutting action are featured. Links have a patented, permanently welded hook form of construction, which can be assembled or disassembled in 5 minutes time, simply by hooking or unhooking. A narrower kerf with a sequence of only 4 teeth is stated to give faster cutting action. This narrower kerf uses less power, but is said to offer greater strength. Another desirable feature is the quickly detachable "Helper's End" which can be easily removed if the saw becomes pinched by the log. The "one-shot" lubrication feature assures long life. The saw is stated to cut through soft wood of an average of about an inch per second—hard wood in about double this time. Standing trees can be cut within 2 ins. of the ground.

Sea Going

LIKE THE RUBBER LIFE RAFT

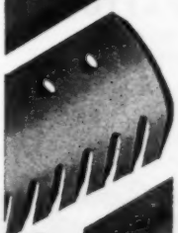
Certain types of Owen Buckets have grit-tight bearings, special lubrication and other features to adapt them to underwater digging and assure long life under this difficult service.

The OWEN BUCKET Company
6070 Breakwater Avenue • Cleveland, Ohio
BRANCHES: NEW YORK PHILADELPHIA CHICAGO BERKELEY, CAL.

OWEN BUCKETS

A MOUTHFUL AT EVERY BITE

Shunk
GRADER AND SCARIFIER
BLADES



For any type or make of machine—Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls, Snow Plows. Also—

CUTTING EDGES, WEARING BOOTS, BACK SLOPERS, EXTENSION BLADES, MOLDBOARDS and SCARIFIER TEETH

50 years of specializing in the manufacture of Construction Equipment Blades has developed for your benefit a quality of special steel, milled through our own rolls and forged at the edges to give that extra cutting and wearing quality you need.

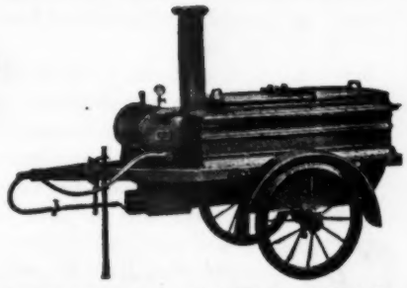
Furnished in various widths, lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

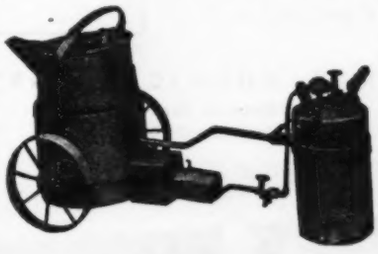
Shunk
MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO

CONNERY'S HEATING KETTLE

For speedy heating of tar and asphalt—

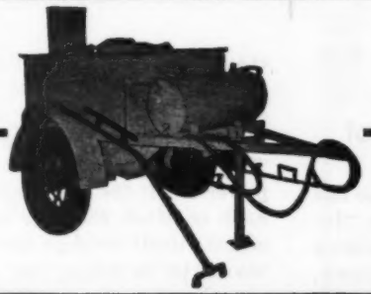


Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.



Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring sets, etc.

CONNERY CONSTRUCTION Co.
3900 North Second St. Philadelphia, Pa.



ASPHALT and TAR KETTLES

FIRE PROOF—OIL BURNING
Hand and Motor driven spray.
Many sizes. Write for catalog.

Elkhart **White Mfg. Co.** Indiana

UNIT

mobile CRANE
SELF-PROPELLED

NEW FULL VISION CAB

5 to 7 TON

Write for particulars

Powerful, fast-stepping Mobile Crane . . . one-man operated . . . for "on and off" highway operations . . . simple to operate . . . (eliminates cut-up terrain, mutilated concrete decks and runways.)

UNIT CRANE & SHOVEL CORP. MILWAUKEE 14 WISCONSIN

REILLY ROAD AND AIRPORT MATERIALS

● In addition to BITUVIA Road Tar, REILLY also produces other materials which you will need in your program of road, highway and airport construction, repairs and maintenance. Check the list at the right.

BITUVIA, which conforms to all standard State Highway specifications, is particularly adapted for maintenance work because it requires a minimum of equipment and man hours per mile.

A REILLY engineer will be glad to show you how BITUVIA, and other REILLY products, can be used to advantage on most every type of road, highway and airport project.

Reilly COAL TAR PRODUCTS

- BITUVIA Road Tar
- PLASTUVIA Crack and Joint Filler
- CREOSOTED Guard Rail Posts
- CREOSOTED Bridge Timbers
- CREOSOTED Piling
- BRIDGE PAINT
- TRAFFIC LINE PAINT
- CONCRETE CURING COMPOUND
- WOOD PRESERVATIVES
- PIPE ENAMEL

REILLY TAR & CHEMICAL CORPORATION

2513 S. Damen Ave., Chicago 8, Ill. | Merchants Bank Bldg., Indianapolis 4, Ind. | 500 Fifth Ave., New York 18, N. Y.

New Dust Collector

A powerful yet inexpensive unit type dust collector has been announced by the Ideal Commutator Dresser Co., 1372 Park Ave., Sycamore, Ill. Standard attachments simplify installation on grinders, buffers, sanders, polishers, lathes and other machines. Being compact in size it readily fits behind or beside machines as they stand. Relocation of machines, elaborate housing, separate rooms, expensive ducts, etc., are unnecessary. 500 cubic feet per minute is developed through the two inlets by a ¾ h.p., 3450 r.p.m. motor, driving a 7½ in. dia. x 2 in. wide squirrel cage blower wheel.

▼

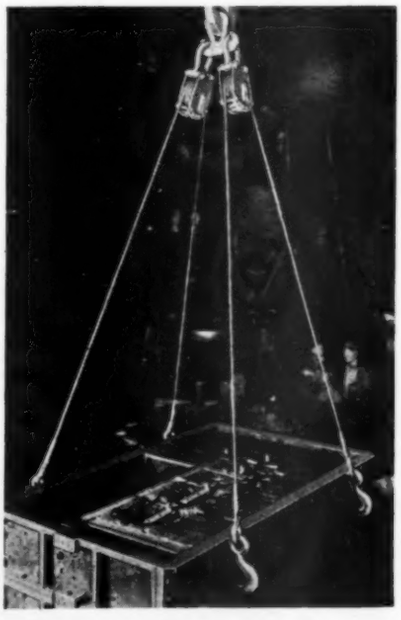
Movie Shows Installation of Joints

Keystone Asphalt Products Co. has produced a new full-color movie "Installation of Mastic Board Dummy Joint and Center Strip." The movie, most recently presented at the Purdue Road School this winter, has also been viewed by large audiences at the AASHO in Cincinnati, the ARBA in Chicago and at numerous private showings to highway groups. The picture gives detailed views of the actual installation of expansion and contraction joints under various conditions and brings out the ease of handling and economies of modern installation methods. According to Keystone's Jim Poole, who produced the picture, taken on actual jobs through the country, arrangements can be made for showings to representative groups by writing him at Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.

▼

New Sizes "Level Lift" Slings

Two new sizes have been added to the line of "Level Lift" slings of the Macwhyte Co., Kenosha, Wis. The complete line of Macwhyte Caldwell "Level-Lift" Slings, all patented, are now made in ¾ ton, 1½ ton, 3 ton, and 6 ton capacities. They formerly were made only in 3 ton and 6 ton capacities. This sling was exhibited at the National Safety Congress last year for the first time. The operation is simple. After the light-weight block containing wire rope is put on the crane hook, the crane operator spots the crane hook over the approximate enter of gravity of the load and the floormen attach the sling to the load. The crane operator then applies the power to lift the load, and as the crane hook is lifted, the rope automatically adjusts itself through the "Level-Lift" block. In so doing, one sling leg of rope becomes longer than the other, and as the weight of the load pulls on the wire rope, the sheave in the block pulls down against a brake which prevents slippage. The load is then lifted level.



Pair of "Level-Lift" slings handling a foundry flask

Obituaries

Charles D. Snead, division engineer of the Public Roads Administration, Federal Works Agency, died recently after an illness of several months. For some years he directed federal highway activity in the South with headquarters at Montgomery, Ala. Mr. Sneed served the Virginia highway commission, 1908 to 1916. From 1916 to 1920 he was in charge of state bridge work in Kentucky. In 1920 he entered the service of PRA (then the Bureau of Public Roads) as senior highway bridge engineer, Alabama district office. He prepared special reports on the causeway and bridges for the Key West Highway and supervised preparation of plans for many different types of bridges, some of which were notable for the deep-water foundations required. He became district engineer in 1930.

Charles D. Snead

▼

James T. A. McCann, 52, assistant engineer of the Department of Public Works, White Plains, N. Y., died recently in that city. He had been an employe of the city for 28 years.

▼

John Williams, retired engineer and contractor, whose company built the Manhattan foundations of the Queensboro and Manhattan bridges, died in New York City, Feb. 3 at age 70. He was a partner with the late James J. Frawley in the Williams Engineering & Contracting Co.

▼

Arthur O. Olson, 47, for 22 years assistant bridge engineer of the Wisconsin Highway Commission, died March 22 in Madison, Wis.

▼

Capt. Hugh P. Oram, 61, former assistant engineering commissioner of the District of Columbia, died Feb. 27 in St. Petersburg, Fla.

▼

C. J. Erling, well-known road contractor of Sioux Falls, S. Dak., died recently in that city. He was a partner in the Northern Improvement Co., Fargo, N. Dak.

▼

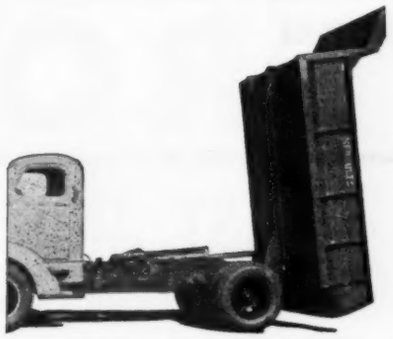
Edgar S. McCandliss, 60, chief of the civil works division, Denver office, U. S. Army Engineers, died recently in Los Angeles, Calif.

For Every Dumping Job, There's A

HERCULES HYDRAULIC

Dump Body and Hoist

Hercules Removable Side Rub Rail Body With Hinged Rear Corner Post.



Hercules High Dumper-Power Up, Power Down, with 78° dumping angle. Hoist capacity 12 tons.

Many other body styles, in many sizes, and 6", 7", 8" and 10" Hoists, are available.

A HERCULES HYDRAULIC BOOSTER HOIST

Makes any Truck A **DUMP TRUCK**

UNLOAD the EASY WAY! SAVE TIME, MANPOWER and MONEY by installing Booster Hoists under your Stake, Platform, or Special Bodies. 50° Dumping Angle will dump any material such as Coal, Grain, Earth or Sand. See your Hercules Distributor or Write

HERCULES STEEL PRODUCTS COMPANY

GALION, OHIO

Manufacturers of Hercules Hydraulic Hoists, Dump Bodies, Split-Shaft Power Take-Offs and "Power-Chute" Hydraulic Coal Unloaders

RELIANCE

CRUSHING, SCREENING and WASHING UNITS

● Up to 2000 Tons a Day ●

Crushers	Bins	Drag-Lines
Elevators	Pulverizers	"GAYCO"
Sweepers	Feeders	Centrifugal
Screens	Spreaders	Air Separators
Wash Boxes	Kettles	
	Conveyors	

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y.
Canadian Representatives: F. H. Hopkins & Co., Ltd. 140 Canada Cement Co., Montreal, Que., Can

VULCAN

VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOG today.

VULCAN TOOL MFG. CO.
QUINCY, MASS.

UTILITY PATROL

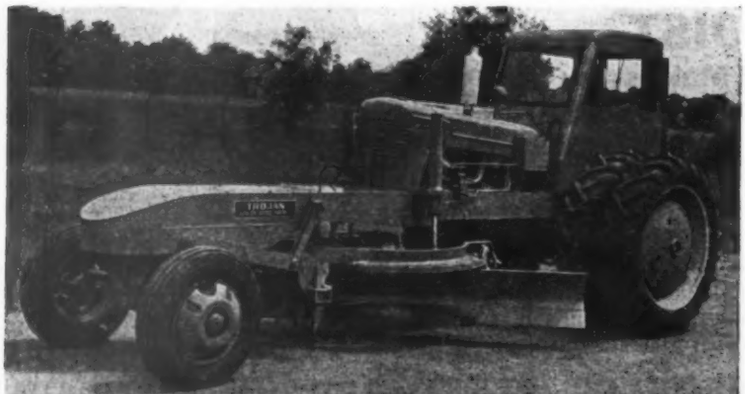
TROJAN

FAST AND DEPENDABLE

Complete one-man control makes this Welterweight the choice of Street, Highway Depts. and Contractors. Its superior construction and advanced design give you a reliable tool that will do more work in less time. Write today for the Trojan story of performance.

CONTRACTORS MACHINERY CO. INC.
Dept. RS Batavia, N. Y.

Sold through the International Industrial Dealer in your community



Trojan Self-Powered Speed Tamping Rollers do an outstanding job on Airport Construction

Manufacturers' Literature

New Subgrader Bulletin

Bulletin No. S2 describing the Standard-Lewis Subgrader is now available by writing Standard Steel, 5001 So. Boyle Ave., Los Angeles 11, Calif. This grader is designed to meet the contractor's demands for lower subgrading costs and the engineer's exacting requirements for finished subgrade. Standard Steel engineers have incorporated into this equipment many exclusive features, which are described in this bulletin.

"Weldors Guide to Successful Hardfacing" is the title of a helpful and practical publication issued by Mir-O-Col Alloy Company, 2416-30 E. 53rd St., Los Angeles 11, Cal. Compiled under direction of W. Wesley Mills, member of SAE, this guide defines hardfacing and its uses, names metals which can be hardfaced, and has chapters on the effect of heat on metals, the acetylene and elective processes, hardfacing crusher jaws and grader blades, and suggested applications of the company's products. Booklet free on request to above address.

With the Manufacturers and Distributors

Worthington-Ransome Sales Organization Announced

Worthington Pump and Machinery Corporation, Harrison, N. J., becomes one of the nation's largest manufacturers of construction equipment with the acquisition of the Ransome Machinery Co. line of concrete machinery.

Some new types of equipment under development will be ready for production after the war. All products will carry the well-known "Blue Brute" trade name and includes Worthington's line of contractors, portable compressors, rock drills and air tools. C. F. Oeschle, Worthington's Assistant Vice-President, has been placed in charge of the Worthington-Ransome Construction Equipment Sales Organization, with headquarters at Holyoke, Mass. He will be assisted by W. F. Lockhardt, Sales Manager of Ransome Machinery Co., located at Dunellen, N. J., and W. J. Fleming, Field Sales Manager, located at Holyoke, Mass. Five regional offices are located in New York, Washington, D. C., Cleveland, Chicago, and San Francisco.

Richkraft Cleveland Distributor

The Richkraft Co., Builders Bldg., Chicago 1, Ill., has appointed the Cleveland Builders Supply Co., Marion Bldg., 1276 W. Third St., Cleveland 13, O., to represent them on both road sales and general sales in the Cleveland territory.

R. P. Tyler Appointed General Sales Manager for Macwhyte

R. P. Tyler has been appointed general sales manager for Macwhyte Co., wire rope manufacturers, Kenosha, Wis. He is widely known throughout Industry, having been sales manager for A. Leschen & Sons Rope Co., of St. Louis, and prior to 1940 in sales and engineering capacities with John A. Roebling's Sons Co., of Trenton, N. J. Mr. H. E. Sawyer, formerly general sales manager as well as V. P. and Treasurer of Macwhyte Co., will continue as V. P. and Comptroller.

R. P. Tyler

O. G. Mandt Now President of Jaeger

O. G. Mandt, for the past 17 years vice president and general manager of The Jaeger Machine Co., Columbus, O., was made president of that organization Feb. 3. Gebhard Jaeger, former president, was elected chairman of the board and R. McLean named first vice president, in charge of sales. Entering the construction industry in 1906 as a manufacturer of tilting concrete mixers, The Jaeger Machine Co. has expanded to become one of the largest manufacturers of contractors pumps, various types of mixers, truck mixers and road spreading and finishing machines. During the war it has engaged in the large scale production of invasion ship winches, air compressors, and material loaders and cranes for war needs. These latter lines, which were introduced to over 700 of Jaeger's distributors, highway officials and contractors at an exhibit held in the company's plant in January, will be continued for civilian use after the war.

F. W. Sparks New Regional Manager for Cummins

F. W. Sparks

F. W. Sparks has been appointed manager of the Cleveland Region for the Cummins Engine Co., Inc., Columbus, Ind., manufacturer of diesel engines. His headquarters will be at 805 Fidelity Bldg., Cleveland 14, O. The region includes Ohio and Michigan. Mr. Sparks has been a member of the Cummins sales department for several years, most recently having been located at the home office. He is widely acquainted among the manufacturers of industrial and automotive equipment, many of whom are located in the Cleveland area.

New Knoxville, Tenn., Distributor for Chain Belt

Chain Belt Co. of Milwaukee, Wis., has announced the appointment of Martin Machinery and Supply Co., 700 Dale Ave., Knoxville, Tenn., as distributors of the complete line of Rex construction machinery in the Knoxville, Tennessee area. The organization is newly formed, but the personnel is experienced in the construction machinery business. The firm is headed by Mr. Karl R. Martin. Associated with him are John Hay, L. C. Biggs, Houston Brown and Karl R. Martin, Sr.

Self-cleaning

The Insley Type K Excavator (3/8 or 1/2-yd.) is a real "mudder." Crawlers are self-cleaning . . . long and wide . . . individually controlled. This combination of features provides a high degree of mobility . . . prevents hang-ups in the soft spots . . . assures fast, easy handling in the closest quarters.

Here is but one of many outstanding features of Insley design and construction that you'll want in your postwar dirt or rock moving and material handling equipment. Get the complete story now. Be among the first to specify an INSLEY Excavator when production for civilian needs is again resumed.

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

Rockford Drilling Machine Changes Name

The name of Rockford Drilling Machine Division of Borg-Warner Corporation, at Rockford, Ill., has been changed to Rockford Clutch Division. With three factories in war production, and a corresponding increase in its engineering activities, the division has acquired the Borg-Warner research laboratory at Rockford and will operate it as the Rockford Clutch Engineering Laboratory.

Harrison Promoted

R. R. Harrison has been appointed Manager of the Fruehauf Trailer Company Kansas City Branch, it is announced by A. K. Tice, vice-pres. in charge of sales. Mr. Harrison has been a salesman in the outside territory of the Fruehauf Chicago Branch since May, 1941. Prior to that time Harrison was associated with the International Harvester Company. He is a veteran of the Army Air Corps in the first World War.

✔ CHECK THESE REFINEMENTS IN PORTABLE ASPHALT PLANT DESIGN

LARGER FAN • NEW HORIZONTAL CYCLONE DUST COLLECTOR • NEW TYPE SCREEN • REDESIGNED DUCT SYSTEM

— FROM DRYER TO DUST COLLECTOR AND FROM DUST COLLECTOR TO EXHAUSTOR

H&B ESTABLISHED 1867

● In addition to the refinements in design listed above, this portable Hetherington & Berner plant also has a unit assembly of the exhaust fan, motor which drives the dryer, and the speed reducer—mounted on a separate platform. This decreases the length of the dryer unit, and greatly facilitates handling. The new type of screen reduces the overall height of the plant without reducing bin capacity. Complete information on this more efficient portable asphalt plant will be furnished on request.

HETHERINGTON & BERNER INC.

721 Kentucky Avenue • Indianapolis 7, Indiana

Hetherington & Berner

FOR BEST RESULTS . . . HOT MIX — BATCH MIX

A. P. Hall New General Sales Manager of American Chain & Cable Co., Inc.

Alton Parker Hall has been appointed general manager of sales of American Chain & Cable Co., Inc., with headquarters at 230 Park Ave., New York. Mr. Hall joined the company about a year ago as assistant general manager of sales after having been with Bethlehem Steel Co. for 22 years. Born in Kingston, N. Y., he was graduated from the Kent School in 1918, and from Princeton University in 1922. During World War I, he served in the Army and became an officer in the Field Artillery Reserve Corps. He is well known in the metal and allied industries.

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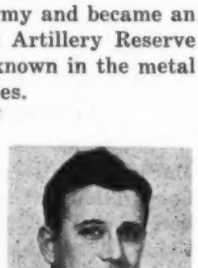
Scotchlite Appointment

Bert S. Cross has been named general manager, "Scotchlite" division, Minnesota Mining & Mfg. Co., St. Paul, Minn.



Bert Cross

Breth, Schindler, Sonneborn V.P.'s

Election of Dr. F. W. Breth and Gustave Schindler as vice-presidents of L. Sonneborn Sons, Inc., N. Y., oil refiners and manufacturers, has been announced by President Ferdinand Sonneborn. Dr. Breth, who will have charge of manufacturing, joined L. Sonneborn Sons, Inc., in 1915 as chief chemist and for many years has been technical director. He has been instrumental in development of many new products and processes; is an active technical committeeman in ASTM and other associations and a councillor of American Petroleum Institute.

Dr. F. W. Breth

Gustave Schindler

Mr. Schindler, age 35, has operated a group of refineries which manufactured many specialized petroleum products. Recently he was president of Petroleum Specialties, Inc., New York City.

▼

R. R. Howard Resigns from Anthony Co.

Richard R. Howard, vice-president and general manager of the Anthony Company, Streator, Ill., has withdrawn from his active duties with this company as of March 1, 1945. He will remain, however, as a director of the company. Mr. Howard has been with the Anthony Co. 24 years, and is an outstanding figure in the Hoist and Body Industry.

▼

E. H. Branning Now with Wood Shovel & Tool Co.

E. H. Branning has been appointed General Manager of the Wood Shovel & Tool Co., Piqua, O. Until Nov. 1, 1944, he had been Head of Hardware and Tools Procurement Division of Army Service Forces. Mr. Branning brings to the company, its distributors, and its

E. H. Branning

dealers, a wide and versatile experience in the manufacture and merchandising of hardware products. His previous connections have been as follows: From 1923 to 1931 he was vice president and general manager of the J. F. Rittenhouse Manufacturing Co., Akron, Ind. In 1931 he consolidated this company with Cronk and Carrier Manufacturing Co., Elmira, N. Y., and F. E. Kohler Co. of Canton, O., the three companies forming the CKR Co., Cleveland, O. Mr. Branning became president of the new company. When the CKR Co. was merged with the American Fork and Hoe Co. of Cleveland, in 1937, Mr. Branning joined this latter company in an executive capacity, remaining there until 1942, when the Government asked for his services.

W. W. Paape Appointed Euclid Sales Representative

W. W. Paape

W. W. (Bud) Paape has been appointed sales representative for The Euclid Road Machinery Co., Cleveland, O. Mr. Paape has been active in the construction equipment industry for 20 years. Prior to coming to Euclid he was sales manager of Syracuse Supply Co. and prior to that time formerly served as representative for Caterpillar Tractor Co. and LaPlant Choate Mfg. Co. At present he is making his headquarters at the main offices of the company in Cleveland and is temporarily assigned to the territory including Ohio and adjacent states.

$625,000 Building Program Will Double Production of Model L Cummins Diesels

Officials of the Cummins Engine Co., Inc., Columbus, Ind., have revealed plans for the immediate construction of a new building which will permit this diesel engine manufacturer to double present production of the heavy-duty Model L Cummins diesel. The project will cost $625,000 and will be financed entirely by the company. Although details regarding construction have not been disclosed, the building will be a fireproof, one-story structure, modern in every detail. Overall dimensions are 80 ft. wide by 470 ft. long, providing an additional 35,000 sq. ft. of floor space. It will be erected on the site of a factory parking lot, next to the injector and fuel pump building. Company officials expect the new addition to be completed and ready for use by Autumn.

The Frink "V" Type Sno-Plow uses an entirely different principle than other makes. The rear of the plow is suspended from the truck attachment by two heel adjusting chains so that the weight of the snow on the moldboards is used to create a downward pressure, which ballasts the front end of the truck and counteracts side thrust. This is but one of the many features of the Frink. Write today for further information.

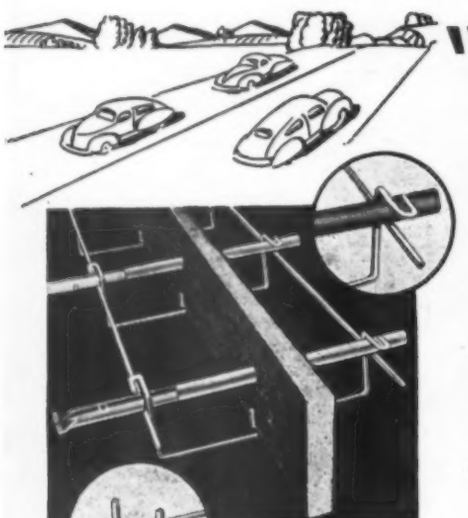
FRINK SNO-PLOWS
REG. U.S. PAT. OFF.

CARL H. FRINK, Mfr., CLAYTON, 1000 Isl., N. Y.
DAVENPORT-BESLER CORP., DAVENPORT, IOWA
FRINK SNO-PLOWS OF CAN. Ltd., TORONTO, ONT.

Evans Machinery & Equipment Co. Organized

Louis Levenson and S. Howard Evans have formed the Evans Machinery & Equipment Co. with offices at 770 South Schuylkill Ave., Philadelphia, Pa. They will distribute the products of Four Wheel Drive Auto Co., Contractors Machinery Co., Inc., Wm. Bros. Boiler & Mfg. Co., E. D. Etnyre & Co., and other road equipment lines. Louis Levenson terminated his position with the War Production Board, Washington, D. C., as of Jan. 17, 1945. For the past 3½ years, as Chief of the Maintenance Machinery Section, Government Bureau, War Production Board, he was in charge of programming and distributing all construction machinery purchased by states, counties, cities, and townships. S. Howard Evans will join the Evans Machinery and Equipment Co. as soon as his connection with the War Production Board ceases. For the past 2½ years Mr. Evans has been with the Board serving as Director of the Government Requirements Division, Government Bureau, and as WPB National Coordinator of Community Facilities.

True To Name . . .



"QWIK-LOCK"

Expansion Joint Assemblies

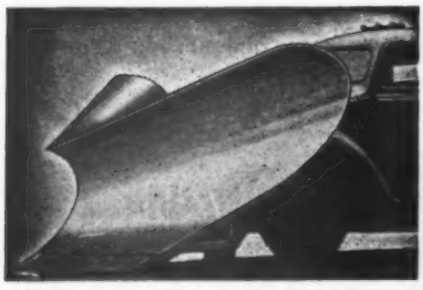
For easy installation and foolproof functioning, "QWIK-LOCK" Expansion Joint Assemblies can't be beat. They are designed to make it easy to position and lock dowels, absolutely parallel to each other and to the subgrade. Thus they speed up road building and assure better joints at lower cost.

Write for Union Steel Products Catalog of Construction Accessories now . . . See Our Section in SWEET'S.

UNION STEEL PRODUCTS COMPANY
417 Pine Street, ALBION, Michigan

CONCRETE & BUILDING SPECIALTIES, LTD.
3334 Danforth Avenue, Toronto, Canada

WILLIAMS WALLACE COMPANY
100 Hooper Street, San Francisco, Calif.



ROOT INTERCHANGEABLE SNOW PLOWS

Highway Commissioners, Road Engineers and Supervisors of road maintenance prefer Root Interchangeable Snow Plows for opening up streets, highways and airport runways, removing barriers of snow and ice. Get the facts, investigate maintenance costs . . . you'll understand the reason why Root plow units "get the nod" when purchasing decision is made by those charged with snow removal in the road, street and airport field.

Write for Bulletin

ROOT SPRING SCRAPER CO.
Kalamazoo II, Michigan
Builders of road maintenance equipment since 1890

Strategically located right in the heart of the city's business, shopping and entertainment district. 700 rooms, each with radio, bath or shower. Service and food as faultless as wartime conditions will permit. Reservations well in advance will enable us to prepare for you—consequently, to serve you better.

Lord Baltimore Hotel
BALTIMORE 3, MARYLAND

J. Nieberding Returns to Goodyear

After several years in the U. S. Army, Joseph Nieberding has returned to the Goodyear Tire & Rubber Co. as a field representative in Chicago for the Mechanical Goods Division. He was with Goodyear more than 15 years before being commissioned in the Army. Harold Murtaugh, whom Nieberding replaces in Chicago, was transferred to the St. Louis district as Mechanical Goods field representative at Harrisburg, Ill. Formerly a clerk in the Chicago office, and in merchandise distribution in Akron, Murtaugh has been with Goodyear about 10 years. W. C. Breidenthal, who started with Goodyear's Mechanical Goods Division in Akron in June of 1942 in office training, and who became a junior staff man in the belt department, was appointed a Mechanical Goods field representative in Knoxville, Tenn.

▼

Gilbert H. Gaus Heads Gardner-Denver New York Office

Gilbert H. Gaus has recently been appointed manager of the Gardner-Denver Co.'s New York branch office at 76 Ninth Ave. He succeeds G. V. Leece, vice-president, who has been placed in charge of the company's Export Division. For the past seven years Mr. Gaus has been with the Gardner-Denver New York office as sales engineer, handling all products manufactured by the company. Previous to joining the company in 1938, he had 18 years' experience in engineering and sales in the New York area, on pumps and other mechanical and electrical equipment for industrial plants, power plants, water works and sewage plants.

▼

Jack Thorp Opens Agency in New York

The John N. Thorp Company, 50 Church Street, New York City, has been formed by Jack Thorp as a distributor agency for well-known lines of construction equipment, machinery and railway supplies. Several manufacturers have already selected the Thorp Company to represent their lines in the New York metropolitan area and vicinity.

Jack Thorp is particularly well known among distributors, having been Manager of the Construction Equipment Division of the Chicago Pneumatic Tool Company for eight years, and prior to this, twelve years as special representative of Ingersoll-Rand Company in their Railroad and Construction Department.

Wyandotte Chemicals Adds Calcium Chloride Specialist

F. R. Sproule has recently been added to the staff of Wyandotte Chemicals Corporation as a calcium chloride technical representative. Mr. Sproule has been active for many years in both laboratory research and field construction on soil stabilization, and has spent 12 years in the development and promotion of materials for highway construction. A chemical engineering graduate of University of California, Mr. Sproule has lived on every continent and has observed road building methods and materials under many climates and conditions. He spent 12 years with American Bitumuls Co. and Col-Tex Refining Co. Mr. Sproule will be available to those needing calcium chloride for dust control, consolidation of gravel bases and surfaces, frost control, admix and surface curing in concrete, and for other construction uses.

F. R. Sproule

▼

J. H. Middlekamp Joins Mack

John H. Middlekamp, recently resigned director of the Automotive Division of the War Production Board, has been appointed manager of the Government Department of Mack Trucks, Inc., New York. Mr. Middlekamp was director of the automotive division of WPB from Jan. 1, 1944, until his resignation Jan. 6 of this year. Prior to that he had spent 1½ years as a lieutenant colonel with the Army handling its truck production problems, resigning to join WPB. Mr. Middlekamp will continue as a consultant to WPB and will retain his chairmanship of the Truck Committee of the Combined Production Resources Board. He will make his headquarters in Mack's executive offices in New York's Empire State Building.

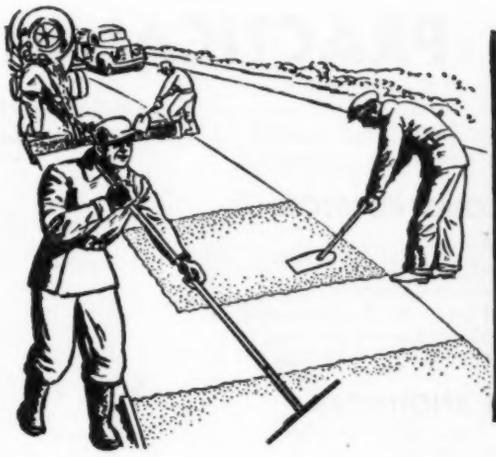
J. H. Middlekamp

▼

New Barber-Greene Distributors

Barber-Greene Company, Aurora, Ill., manufacturers of asphalt paving equipment and material handling machines, announces the appointment of the following representatives in their Construction and Industrial Divisions: (Kentucky): Brandeis Machinery & Supply Co., Brook & Warner Sts., Louisville 8, Kentucky. This firm has represented Barber-Greene for 25 years and will now serve the two southern tiers of Indiana counties as well as Kentucky. (Western Michigan): Parmenter & Andre, 200 Ionia Ave., N.W. Grand Rapids, Mich., Industrial Division. (Western Ohio and Southeastern Indiana): Carroll-Edwards & Co., 6508 Montgomery Road, Cincinnati, Ohio, Construction and Industrial.

PUT WARTIME TEMPO
IN YOUR PAVEMENT PATCHING



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Calcium chloride is the most effective as well as the least expensive way to get safe strength—FAST—in fact, in less than half the time of plain concrete.

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Use normal protective measures, of course, but take advantage of the automatic, built-in curing that calcium chloride provides —that keeps concrete action alive when the weather is cold.

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Heavy duty dump truck, standard make, gas or diesel, in good condition. 4 yd.-5 yd. body preferred.

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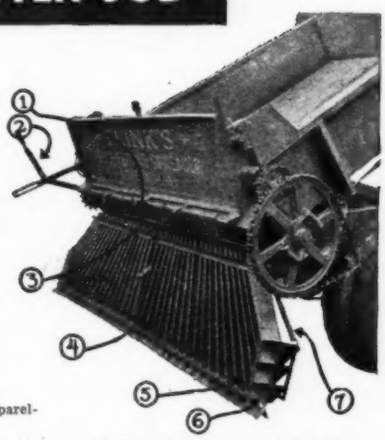
Spreads at 12 to 20 Miles an Hour



Spreads an even layer of material faster. Keeps a perfect edge! The Flink "Sand-Chip" spreader attachment for Flink self-feeding material spreaders. Spreads by "controlled" gravity.

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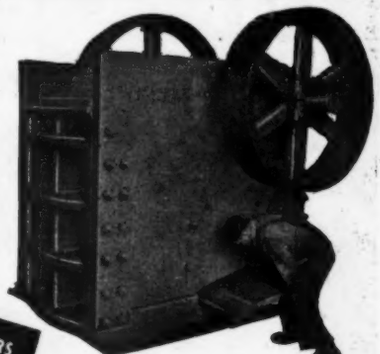

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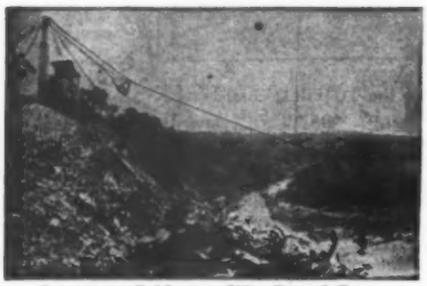

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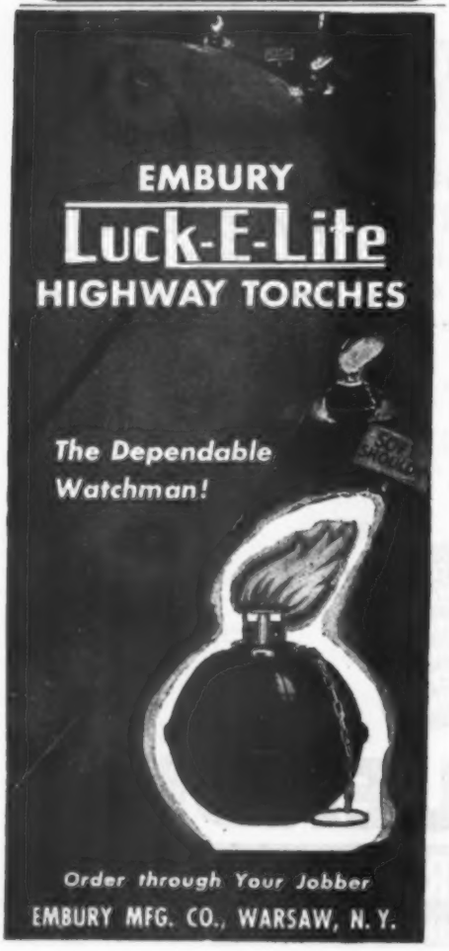


Index to Advertisers

A

*Adams Company, J. D.....Second Cover
*Aeroil Burner Co., Inc.....116
Allis-Chalmers Tractor Division..... 15
American Cable Division....Third Cover
American Chain & Cable Co., Inc. .....Third Cover
Amer. Steel & Wire Co..... 38
Armco Drainage Products Assn..... 4
Associated Equipment Distributors... 85

B

*Baker Mfg. Co., The..... 45
*Barber Greene Co..... 51
Barrett Co. 98
*Bethlehem Steel Co. 1
Blackhawk Mfg. Co..... 37
Brooks Equipment & Mfg. Co.....113
*Buckeye Traction Ditcher Co..... 54
Bucyrus-Erie Co. 27
Byers Machine Co., The.....113

C

Calcium Chloride Assn. 125
Caterpillar Tractor Co. 35
*Cleaver-Brooks Co. 46
Cleveland Rock Drill Co..... 6
Connery Construction Co. 117
*Contractors Machy. Co., Inc.....120
Cummins Engine Co..... 33

D

Davey Compressor Co. 115
Detroit Diesel Engine Div..... 10
Dietz Co., R. E..... 86

E

*Electric Tamper & Equip. Co.....110
*Embury Mfg. Co.....128
Euclid Road Machy. Co..... 53
Etnyre & Co., E. D.....113

F

Fawick Airflex Co., Inc..... 47
Flink Co., The.....127
*Flexible Road Joint Machine Co.....116
Foote Company, Inc., The..... 32
Ford Trucks 22
*Four Wheel Drive Auto Co..... 25
*Frink, Carl H.....123

G

*Galion Iron Works & Mfg. Co., The... 29
*Gar Wood Industries.....70-78
Gemmer Mfg. Co..... 66
General Motors 10
Gillette Publishing Co.....50-126
*Gruendler Crusher & Pulverizer Co...127

H

*Hanson Clutch & Machy. Co.....12-13
*Heil Co. 9
Hercules Roller Co.....111
Hercules Steel Products Co.....119
Hetherington & Berner, Inc.....122
Huber Mfg. Co., The..... 41

I

Insley Mfg. Co. 121
International Harvester Co. 52
International Salt Co..... 8

J

Jahn Co., C. R.....109
Jackson Vibrators, Inc.....110
*Jaeger Machine Co., The..... 39

K

Klauer Mfg. Co..... 19
Koehring Company 14
Koppers Co., Inc. 44

L

*La Cross Trailer & Equip. Co.....115
*Le Roi Co. 89
Le Tourneau, Inc., R. G..... 7
Lima Loc. Wks., Inc..... 16
*Link-Belt Speeder Corp. 18
*Littleford Bros. 17
Lord Baltimore Hotel.....124

M

M. R. & Mfg. Co..... 76
Mack Mfg. Co..... 96
Maguire Industries, Inc..... 49
Marion Steam Shovel Co., The..... 20
McCarter Iron Works, Inc.....116
*Michigan Power Shovel Co.....115
Minnesota Mining & Mfg. Co..... 2
Municipal Supply Co.....125

N

Northwest Engineering Co..... 5
Novo Engine Co. 112

O

Oliver Corp.—(Cletrac Div.)..... 21
*Owen Bucket Co., The.....117

P

Perfection Steel Body Co.....111
Portland Cement Assn..... 42
Preformed Wire Rope..... 24

R

*Reilly Tar & Chem. Corp.....118
*Riddell Corp., W. A.....111
Rodgers Hydraulic, Inc.....105
Rogers Brothers Corporation.....115
Root Spring Scraper Co.....124
Roller Bear. Co. of America.....107
Rotary Snow Plow Co.....74-75

S

*Sauerman Bros., Inc.....128
Schramm, Inc. 55
*Servicised Products Co.....30-31
Shunk Mfg. Co.....117
Sinclair Refining Co..... 34
Sisalkraft Co. 114
Standard Oil of Calif..... 69
Standard Steel Corp..... 72

T

*Texas Co., The.....56-Back Cover
Thew Shovel Co., The..... 3
Timken Roller Bear. Co.....Front Cover
Truscon Steel Co..... 36
Tuthill Spring Co.....127

U

Union Steel Products Co.....124
Unit Crane & Shovel Corp.....117
United States Steel..... 38
Universal Atlas Cement Co..... 40
Universal Road Machinery Co.....119

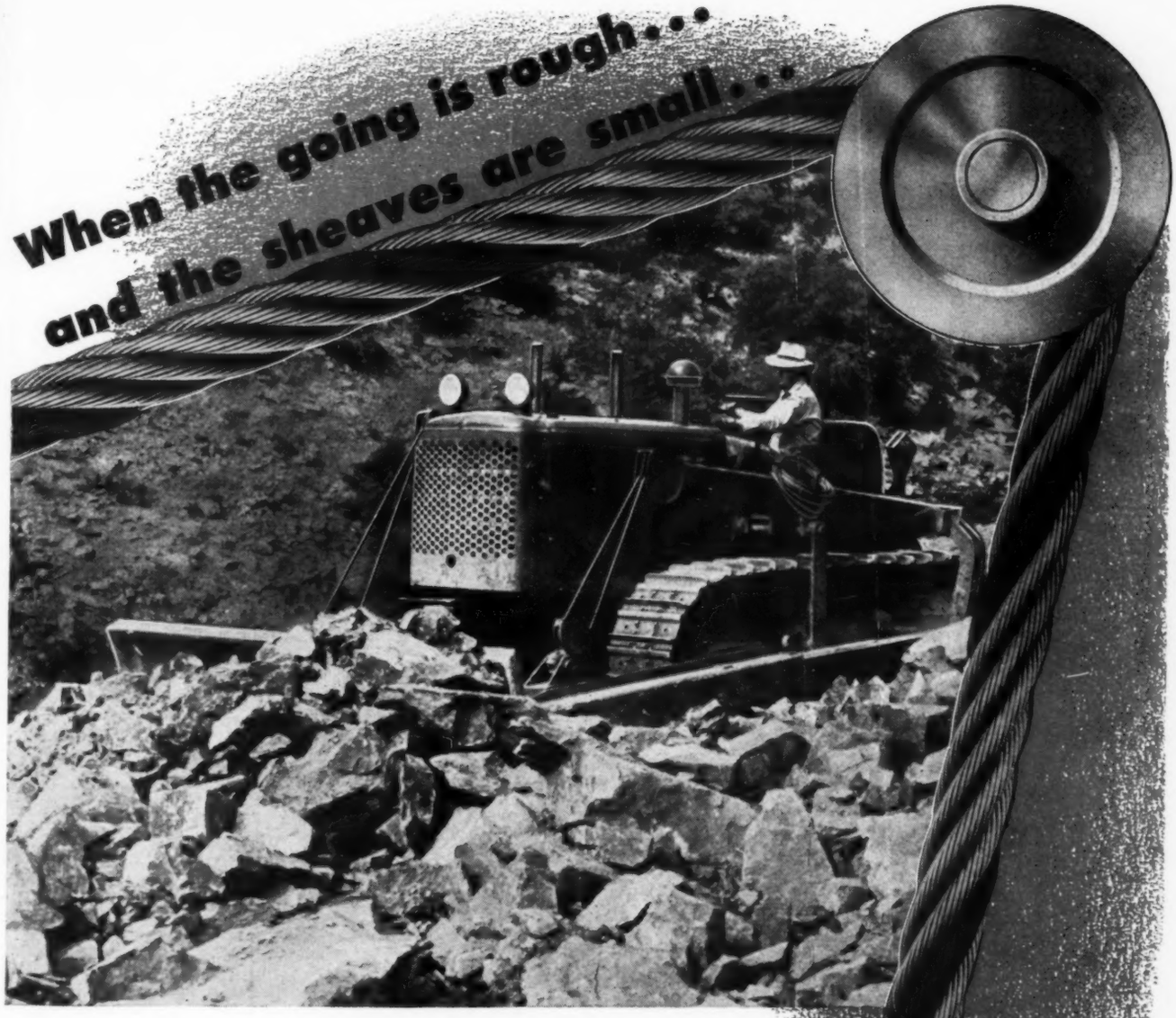
V

Van der Horst Corp. of Amer..... 43
Vickers, Inc. 11
Vulcan Tool Mfg. Co.....119

W

Wallace Tire Service, Inc.....126
Walter Motor Truck Co..... 26
Ward, La France Truck Division Great American Industries (Inc.)... 28
Warren-Knight Co. 108
Wellman Engineering Co., The.....109
W. G. B. Oil Clarifier, Inc.....108
White Mfg. Co.....117
Wickwire Spencer Steel Co..... 48
*Wis. Motor Corp.....113
*Wooldridge Mfg. Co..... 23
Worthington Pump & Machy. Corp..80-81

*Advertisers with * are represented in the 1944 edition of Powers' Road and Street Catalog and Data Book. Please refer to it for additional information on any of their products.



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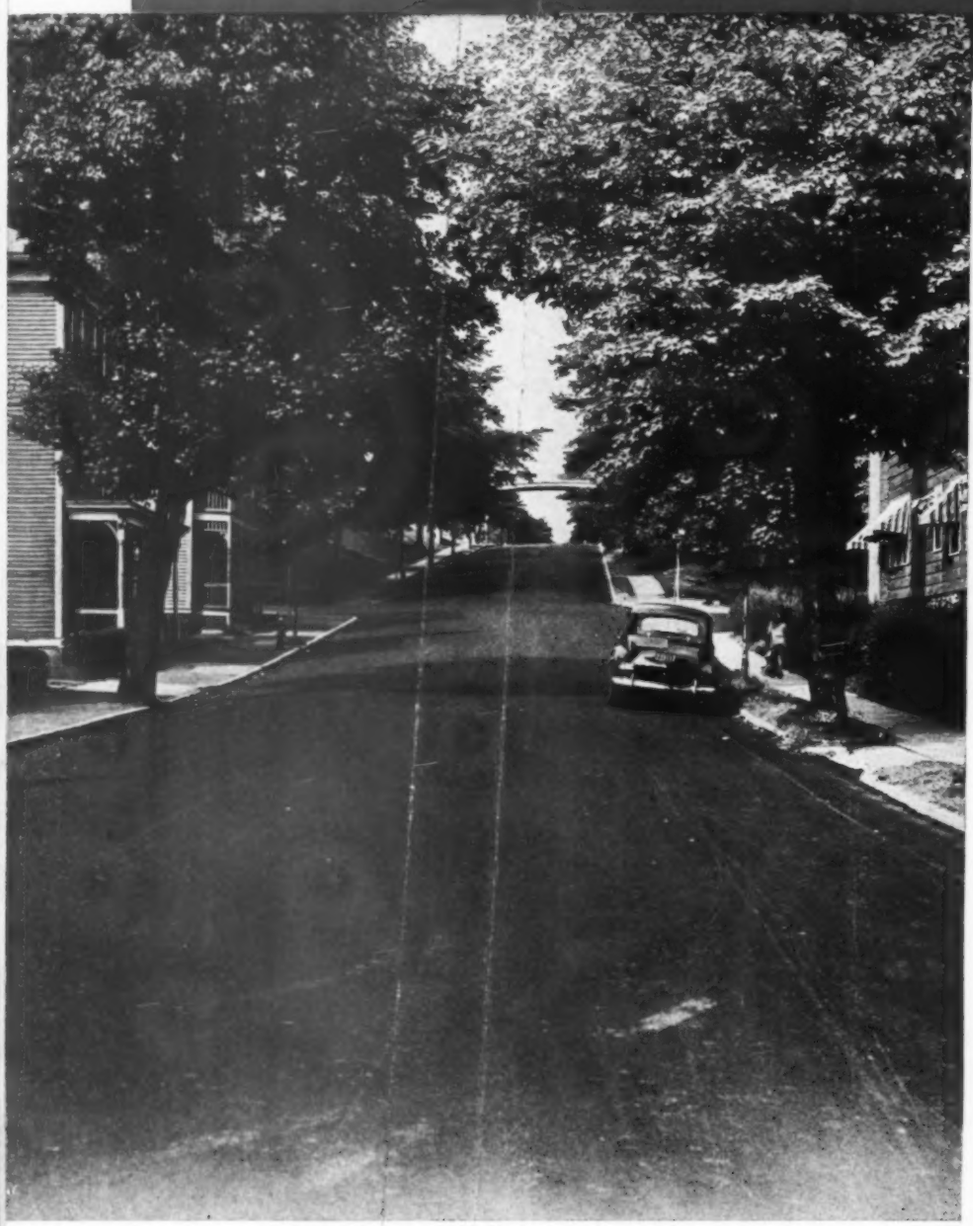

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